NEWSPAPER

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Rate Hikes Delayed On Wats, MTS

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission (FCC) last week temporarily spared users of AT&T's Wats, MTS dial-up telephone network service and private-line services the largest interstate communications rate increases in history.

A 16% increase in Wats and MTS rates, scheduled to become effective last Thursday, was deferred Wednesday afternoon by the commission. Simultaneously, the commission partially deferred a 35% increase in private-line rates, also scheduled to go into effect Thursday.

Of the private-line rate increase, 16.4% was scheduled to be imposed on Thursday. The U.S. Court of Appeals for the Second Circuit in New York City considered a request by the three major radio and TV networks (CBS, NBC and ABC) to defer the rate hike as well. However, late Wednesday the court denied this request.

Under the order issued by the FCC's Common Carrier Bureau last Wednesday, the 16% general rate increase for MTS, Wats and private-line services may be deferred until July 9. However, rates could go up before then. AT&T was requested to supply additional justification for the higher rates. The bureau indicated that upon re-

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Vendors Seek New Ways Of Maintaining Systems

By Marcia Blumenthal
CW Staff

The complexity of today's computer installations and the proliferation of small business systems and terminals are requiring computer equipment vendors to devise new ways of maintaining those systems.

Along with having to service an increasing number of systems, equipment makers and third-party maintenance firms have had to cope with severe shortages of field service technicians in this labor-intensive portion of the industry.

As maintenance is increasingly being considered a profit center within the computer system vendor's organization, the pressure is on to develop ways of delivering the best service at the lowest cost. Some of the more innovative methods include remote diagnostics and user self-maintenance.

In the end, users should benefit from the new techniques, but as yet, many users still are not sold on these methods.

Whatever the end result, vendors and third-party service firms are reorganizing the ways they deliver maintenance service.

One of the leading-edge companies in its approach to maintenance is Hewlett-Packard Co., which three years ago moved its maintenance function to a separate division — the Computer Support Division, now the largest division in the firm.

Industry Spotlight

The division has been expending tremendous efforts to develop a clearly defined concept of maintenance, noted Richard Warmington, service marketing manager for the division. The company recently introduced its "guaranteed uptime" concept, which clearly defines what users can expect from HP's maintenance services including response time; specifications for maintenance procedures; when HP

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Systar Front End Brings X.25 To System/34 and System/38

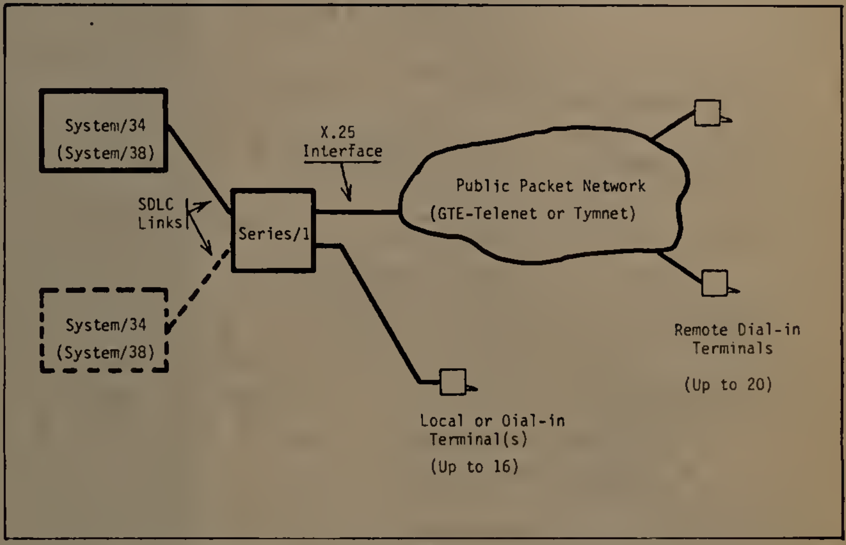
By Brad Schultz
CW Staff

SAN JOSE, Calif. — A communications front-end system that brings the X.25 protocol to IBM's System/34 and System/38 was announced here last week by Systar Corp.

IBM continues to withhold domestic support for X.25 — a protocol widely used overseas and by U.S. public data networks — in its Systems Network Architecture (SNA), which umbrellas all the giant vendor's data communications products.

Called Gateway/34, the Systar front end can connect dispersed users to the System/34 or 38 via any combination of local terminals, dial-up lines, leased lines and public data networks, a spokesman claimed.

Based on IBM's Series/1 minicomputer, Gateway/34 reportedly can reduce the user's communications costs by supporting the dial-in facilities of such public nets as those of GTE Telenet Communications Corp. and Tymnet, Inc.



Systar's Gateway/34 allows the System/34 or 38 to be accessed from remote network terminals. The Series/1 emulates 5251-12 terminals used by the System/34 and 38.

Besides making two high-performance IBM minicomputers more flexible in a decentralized DP environment, the Systar product renders Telenet and Tymnet more attractive as alternatives to the circuit-switched common carrier networks, which typically charge $15/hour for long-distance telephone calls. The Systar spokesman said Telenet and Tymnet typically charge $5/hour, an advantage IBM customers have had difficulty enjoying because of SNA's incompatibility with the X.25 in those packet-switched networks.

Moreover, Gateway/34 can reduce terminal costs by allowing IBM 3101 terminals to serve in place of the twice-

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Recession Takes Toll

Computer Jobs in UK Evaporate

By Ann Dooley
CW Staff

LONDON — The demand for computer employees in the UK has disappeared "almost overnight" as that country's prolonged economic recession continues to reduce employment opportunities substantially, even in its high-growth computer industry.

Although the U.S. computer industry has remained largely unscathed by the adverse economic conditions and the DP employee shortage is still the No. 1 problem in the industry, such is not the case in England. Computer jobs have been drying up throughout the last six months in the UK, according to a report by Modem Computer Services, Ltd. of London, an employment firm that examined the employment trends of some 1,200 applicants, based on responses to recruitment advertising within certain job categories, primarily in the London area.

According to the report, a "recruitment freeze" is occurring in DP departments, which are traditionally insulated from general economic conditions. The situation is not as bad as that occurring during the 1971 and 1972 recesssion, however, and those companies that are recruiting are in a buyers' market,

(Continued on Page 4)

Report on South Carolina: Up to $55 Million Missing

By Bruce Hoard
CW Staff

COLUMBIA, S.C. — The management structure overseeing information and communications technology for the State of South Carolina is outdated, disjointed and responsible for up to $55 million in unaccountable expenditures annually, according to a report released by the state.

The 177-page report focuses on the convergence of information and communications technologies and pays special attention to telecommunications, information processing, office systems and inventory and cost accounting.

The fragmented management responsibilities for high technology are divided among a bevy of state agencies, all of which exercise various degrees of autonomy and are answerable to the

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For Sales, Circulation and Production contacts, see inside back page.

Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

OTHER EDITORIAL OFFICES:

New York City: Suite 7G, 401 East 80th St., New York, N.Y. 10021. Telephone: (212) 570-2135.

West Coast: 257 Lytton Ave., Palo Alto, Calif. 94301. Phone: (415) 328-8064.

Washington, D.C.: 821 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Steve Burton, IDG Publishing Ltd., 146 Clerkenwell Road, London EC1. Phone: 01-837-1222. Telex: UK-269477.

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 34-90-61. Telex: 5215350.

Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 455-6101. Telex: J2424461.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: SECCO AA25468.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Kevin Kelleghan, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309.

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STSC Unit Offers Portability

VAX-11s Acquire APL Processor

By Marcia Blumenthal
CW Staff

BETHESDA, Md. — STSC, Inc. has introduced an APL language processor which runs on Digital Equipment Corp. VAX-11/780 and VAX-11/750 computer systems.

The APLPlus/2000 is the first portable APL language processor on the market, according to Robert Cook, the firm's vice-president of market development. It is geared primarily for application development for financial analysis and scientific and engineering systems.

The portability feature of the new system will allow STSC to develop language processors for any computer system at about 20% of what it would cost the vendor.

This economy is derived from technology gained when STSC acquired Applied Computer Science Research Corp. in 1979. That firm developed a general model for an APL language processor and STSC used this model to build the VAX language processor and intends to build processors for other systems. However, Cook declined to comment on what manufacturer's system its next language processor would be adapted.

User's Choice

"We have no interest in locking a user into his current hardware. Rather, the firm will provide an APL language processor on many different architectures and let the user make the choice," noted STSC President Daniel Dyer.

Although STSC expects DEC to introduce an APL language processor of its own for the VAX family, that product will probably not be out for a year, Cook estimated.

About a year and a half ago, STSC introduced its first stand-alone APL language processor, the APLPlus, which runs on IBM's 370 and 4300. However, that system started with IBM's VS/APL product and added features to it, Cook explained.

Prior to that time, STSC had offered APL language processor capability only in conjunction with its time-sharing service.

Anticipated Offering

The company also anticipates offering its Integrated Financial Management System software products on the VAX series, probably in August, Cook said.

APLPlus/2000 provides the same features available on APLPlus, but offers a full-screen editor not available on the older system. This editor allows the display of data or text on a CRT terminal and provides a variety of commands for editing that material. Commands included with the editor are valid at any position within the text. After each command, the editor rearranges the entire screen immediately to display the changes made, the firm said.

STSC is offering APLPlus/2000 at a special permanent license fee of $13,000 until July 31. Thereafter, the system will be priced at $18,000. Maintenance is priced at 15% of the prevailing license fee at the time of purchase.

The system will be available for delivery in August.

STSC is located at 7316 Wisconsin Ave., Bethesda, Md. 20014.

'Golden Fleece' Awarded Nasa For Excesses in TDRSS Project

WASHINGTON, D.C. — This month's winner of the "Golden Fleece" award, which Sen. William Proxmire (D-Wis.) gives to the most blatant examples of wasteful federal spending, is the National Aeronautics and Space Administration (Nasa). Its Tracking Data Relay and Satellite System (TDRSS), the senator said, is "over-priced, over-weight, over-sold and over-due."

A recent report by Nasa's inspector general makes it clear that the TDRSS project "was mishandled from the very start," according to Proxmire. The first mistake — Nasa's decision to lease the system over 10 years rather than buy it — "will cost $689 million in interest payments, an increase of 220% over initial estimates," he said.

Because no contractor would assume full financial responsibility for developing TDRSS, Nasa decided to borrow, on behalf of the contractor, from the federal government — specifically, the Federal Financing Bank (FFB).

"In the words of the inspector general's report," Proxmire said, " 'The government, through the FFB, is loaning the contractor money which the contractor in turn loans to Nasa which Nasa must repay to the FFB with interest. The net effect is . . . that the government is borrowing from itself, which only adds to the contract cost.' "

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Computing in Cuba — Part 1

Cuban Users Given No Say in System Choice

By Wendy Quinones
Special to CW

WALTHAM, Mass.— When a Cuban businessman wants a computer, he can't just go out and buy one. Instead, a government agency decides whether he will have one, what type it will be and how it will be used.

According to Peter Graffman, a computer consultant and professor at Bentley College here who recently spent a week in Cuba, computer resources in every facet of the industry are so scarce that the government must be assured that their allocation meets the country's most pressing economic priorities.

Graffman said that centralized decision making about both future development and current applications has been the result, with all computing decisions made through the government's National Institute of Automated Systems and Computing Techniques (Insac).

Divided into a number of smaller institutes, Insac coordinates all research, development, education, installation and technical services in accordance with Cuba's overall economic plans.

Decisions about major goals and applications come from the highest governmental bodies. December's Second Annual Congress of the Cuban Communist Party, for example, determined that increased tourism would produce more badly needed foreign exchange; the practical result was a decision to rapidly develop a computer network and telecommunications to support an extensive travel and hotel reservation system.

Graffman said lower level Insac decisions also cover much smaller applications — that a particular industry should automate its accounting with bookkeeping machines and magnetic cards, for example. The impetus for such applications may come from an industry urging the benefits of automation as well as from Insac itself, he said, but in either case the final decision is the institute's.

Within Insac, the Institute of Project Organization is the subunit responsible for introducing computing techniques. In evaluating the benefits of a proposed application and planning for its development and installation, it draws on other subunits for information and support.

The Institute for Digital Research (Icid), for example, designs both computer architecture and software systems to implement any application. Its CID series of minicomputers has been operating in the country for over a decade.

Technicians to maintain and repair hardware once installed come from the Institute of Technical Services (Servitec). Through Servitec, the government itself is responsible for providing and maintaining each computer installation.

Still another Insac unit, the Administration Center for Computing, provides training for the programmers, analysts, managers and technicians needed by the growing computing sector. Advanced computer science and engineering programs are offered at the University of Havana. In addition, as computing has received more government emphasis, some elementary computer education is included in most curricula.

Important to Economy

"The Cubans emphasize computer literacy and education because they see it as an important part of developing their economy," Graffman said. "But this approach really only started in 1976. It wasn't until then that they emphasized it from the national perspective."

Not surprisingly, the computer industry's scarcity as a resource has meant that the most advanced commercial applications are found in the sugar industry, the mainstay of Cuba's economy. Graffman said that additional major applications are in other areas of economic priority, such as the electric, telephone and textile industries, metallurgy, construction and tourism.

This is the first half of a two-part series.

Future developments aimed at advancing networking and telecommunications are also planned to benefit the sugar industry as well as the more recently emphasized tourist trade. In both cases, primitive systems are already in operation, but capabilities are extremely limited. "Basically, it's just the transfer of data from one machine to another," Graffman said.

In the sugar industry, for example, data on planting times, growth rates and other plantation activities is downloaded daily from each plantation to a central mainframe in Havana, a Soviet ES 1035.

Even with its limitations, however, the system permits central planning and scheduling of the harvesting and transportation equipment that must follow the ripening cane, the readying of processing facilities and forecasting of export shipments.

Eventually, a Cubana Airlines flight reservation system is also to be added. Cuban officials told Graffman they hope to complete this system within the next two years. And to support this and the planned national computer network, development of network protocols and a data base management system is beginning.

But Graffman said Cubans face major hurdles in meeting their development goals. As is the case in other Soviet-bloc countries, parts are difficult to come by and limitations of both current technology and government policy impede rapid development.

In Cuba in particular, the relatively late start of the industry has meant a shortage of adequately trained and experienced scientists and engineers. This problem is compounded by a shortage of Western technological information, as well as by the language barriers that make Soviet-originated materials difficult to use.

In fact, Graffman said, the Cubans appear dependent on two international agencies — Unesco's Intergovernmental Bureau of Information and the International Federation of Information Processing Societies — for what limited Western information they are able to get. Even such common materials as ACM publications are unobtainable or several years old when they can be found.

Wendy Quinones is a free-lance writer based in Gloucester, Mass.

Computer Jobs Disappearing in UK

(Continued from Page 1)

able to pick and choose only the most qualified personnel, the survey showed.

In regard to salary, management and other high-level personnel have reportedly received the largest increases. However, the typical salary of a programmer with two years' experience has stagnated, according to the recruitment firm. It noted that this corroborates a long-term trend in the UK toward the steady decline of DP salaries in relation to those of other occupations. Programmers were paid more during the '60s than accountants with similar experience, but that trend has turned around. Now, in fact, many secretaries and clerks can command salaries similar to those of programmers with two years of experience, Modem claimed.

This reversal was attributed to business users that have become more familiar with computers, thus eroding the exclusivity that traditionally has belonged to computer professionals. Salary levels are likely to stagnate for several months until an economic upturn grabs hold and confidence returns, the survey predicted. In the meantime, it continued, the use of contract staff will increase among organizations that are unwilling to take on additional staff until a more stable growth pattern emerges, and those companies financially able to hire new staff will benefit by attracting the most qualified job applicants, according to the survey.

Experience-Based Salaries

The salary that programmers in the UK are able to command is based almost entirely on level of experience and job location and rarely, if ever, on ability alone, according to the report. Programmers with two years of experience are getting less dramatic salary increases than they did just one year ago, the statistics showed. They are also more concerned with job content and security and are willing to change jobs for smaller salary increases.

Current salaries for senior programmers with three to six years of experience are not so clear-cut, with some employees in this category earning less than the typical two-year programmer does. Because ability plays a more important role in this context, many employers see no reason to pay higher salaries for a programmer with little more to offer than two years of experience, Modem said.

A trend developing in this job category is the tendency to pay a high price for special technical experience, particularly in the IBM software area, the report stated. A second trend has been a dramatic increase in the programmer/analyst role, mainly in response to the increase in minicomputer users that generally prefer to employ two or three general-experience employees rather than separate the functions among several employees.

Modem Computer Services also noted that in another survey of more than 200 British installations, 90% of all DP departments indicated they use contract systems and programming personnel occasionally. The trend toward using contract programmers began during the recession of 1971, when employers reportedly did not want to reemploy large numbers of personnel on a permanent basis.

More survey information can be obtained from Modem Computer Services at New South Wales House, 65/72 Strand, London, WC2N 5LR.

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Business Users Seen Adapting to Packages

By Bill Laberis
CW Staff

WASHINGTON, D.C. — A dearth of available programmers and escalating software development costs will make more users willing to adjust their business procedures to match an inevitable proliferation of packaged applications.

However, manufacturers will have to meet the prodigious challenge of building packaged applications that are at once functional, versatile, modular in design and user-friendly.

"And by user-friendly, I mean written so they're easily understood by the end user and not made uselessly complicated by computer data processing technology and confusing jargon," said William G. Crowell, director of Sperry Univac's worldwide applications development center.

Speaking at a company-sponsored technology briefing here last week, Crowell predicted that vendors will double their output of packaged applications over the next three years.

The demand for these packages is something of a self-fulfilling prophecy, Crowell explained. Plummeting hardware costs will continue to spur widespread end-user activity in virtually all aspects of daily business, creating a crushing applications development need in-house DP departments will not be able to meet on their own.

"Sperry Univac, and others I would imagine, are reacting to this situation by moving from a computer systems manufacturer to a total solution vendor, providing hardware, software and packaged applications," he said.

Ability Doubted

Whether manufacturers can actually rise to the applications challenge, given the sweeping criteria Crowell outlined, may be another matter.

Crowell conceded that meeting ease-of-use (user-friendly) criteria means packaged application designers have to abandon the aimless persuit of DP rhetoric and substitute more natural language access to data bases. Paul Wexelblat, Univac's director of software research, said this amounts to designing software "from the computer out.

"It is not sufficient to look over the shoulder of the user," Wexelblat said. "That is, users usually know what they want to do, what they want to say to the computer. If a user of an on-line system cannot use that system because it is too complex or too hard to learn, then the system is a failure no matter how well it meets its other design goals."

Language Interface

A natural language interface in an applications package should be able to conduct a dialogue with the user to clarify ambiguous or incomplete queries, Wexelblat said. He stressed that simplicity in query languages is of premier importance in package design because "we are going to be stuck at a keyboard for a long time, as voice pattern recognition is just too expensive and limiting."

He said Univac is presently conducting psychological testing to verify or disprove certain hypotheses about the way people communicate with computers.

The tests address various methods for abbreviating long keywords, determining whether commas, spaces or both are suitable for separating sections of a long command and exploring different methods for providing open-ended line numbers.

Portable Packages

Crowell also said it will become increasingly incumbent upon application package designers to build more portable packages — those able to run the applications under different operating systems — as major vendors continue to produce multiple hardware lines.

And to complete its perfectly well-rounded personality, the packaged application of the near future must be usable by many different types of users and be easily modified if required, as well as fully functional, Crowell concluded.

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RACF Update Strengthens Data Security

WHITE PLAINS, N.Y. — IBM's Data Processing Division has announced Version 1 Release 4 of its Resource Access Control Facility (RACF), designed to beef up data security in IBM's larger operating modes.

RACF is designed to extend the security capabilities in MVS, CICS/VS and IMS/VS environments. It provides checking to control user access to applications, permanent direct-access storage device (Dasd) data sets, tape and Dasd volumes, IBM said.

Highlights of the release include a profile modeling feature that reportedly facilitates Dasd data set creation. With the facility, users can now name the profile to be used as a model when creating a new Dasd set. Profile modeling can be automatic for users with IBM's automatic data set protection (ADSP) attribute, the firm said.

Also included in Release 4 is generation data group data set support. With this feature, RACF can allow each member of a generation date group to use a common model profile with the generation group base name. This feature makes it easier to change access lists, IBM said.

List Checking

A list checking for groups function is provided to give the user access to all authorized resources, regardless of the specific user access group. Whenever a user changes, group lists are automatically updated for the next authorization check, IBM said.

In addition, Release 4 offers enhanced password processing features. The Password feature offers a Rule function, that allows up to six rules for user-assigned passwords, a History subkeyword that can save up to 32 previously assigned passwords per user and check newly assigned passwords against the old password set to prevent repetition, and a Revoke subkeyword that sets a limit on the number of consecutive password attempts. If the user exceeds the limit, access to the system is revoked, IBM said.

The RACF release also provides an ALTUSER and a RACINIT command that allows the installation to monitor and reject user-specified password and password expiration interval values based on installation-defined rules. A SPECIAL attribute can be used to define a never-expiring password value, IBM said.

Release 4 costs $605 per month. Effective Sept. 1, the monthly charge will be $775 a month and when IBM's announced unbundling of MVS program products goes into effect Jan. 1, the price will go down to $728 per month. However, users will be faced with an optional maintenance charge. A distributed system license costs an additional $546 per month. Release 4 will be available the fourth quarter of 1981, IBM said.

FCC Delays Wats, MTS, Private-Line Hikes

(Continued from Page 1)

ceipt of this information, it would consider allowing the general rate increase to become effective prior to July 9.

Also deferred last Wednesday was a 35% reduction in AT&T's charges for most international telephone calls.

If the rate increases set aside last week are ultimately implemented, they will add about $1.66 billion a year to the charges levied by AT&T on its customers, according to a company spokesman.

Within the last year, and prior to the latest round of proposed rate increases, AT&T won two private-line rate hikes, each amounting to 5%. And on June 1, Wats rates are scheduled to go up about 30% for many users. This increase will be in addition to the 16% hike in Wats rates that was temporarily deferred last week. As a result, the total increase in users' communications bills is likely to be at least $2 billion annually.

One result of these higher rates — whenever they are implemented — will be to reduce usage of existing private-line services, according to Page Montgomery of Economics & Technology, Inc., a Boston communications consulting firm. It is likely, he added, that AT&T will offer a new private-line service based on usage-sensitive rates and a virtual circuit transmission scheme — which amounts to a packet-switched private-line service.

The phone company's Common Channel Interoffice Signaling System (CCIS) makes such an offering technically possible and, for the data communications users, it would offer more reliable service than either MTS or Wats, Montgomery pointed out. This is because virtual circuits eliminate the busy signals frequently encountered by MTS and Wats users.

A spokesman for GTE Telenet Corp., one of the nation's two packet-network providers (the other is Tymnet, Inc.), said his company would vigorously oppose any attempt by AT&T to offer a virtual circuit-based private-line service. Under the FCC's Second Computer Inquiry Decision, he explained, such an offering would be an enhanced communications service and AT&T could offer it only through a fully separated subsidiary.

Another possible result of increasing Wats, private-line and MTS rates would be to increase business for the specialized carriers. However, if AT&T won its right to charge more, the specialized carriers — based on past history — probably would ask for, and be granted, a similar dispensation by the FCC. The likely result is that the specialized carriers' new rates would end up just below those of AT&T.

However, Satellite Business Systems (SBS), according to a spokesman, will not raise its rates as a result of any increases won by the phone company. Users thinking of switching to SBS, however, face other problems.

The company has two major communications offerings: Communications Network Service (CNS), which caters to private network users, and Exchange Service, a Wats-like offering.

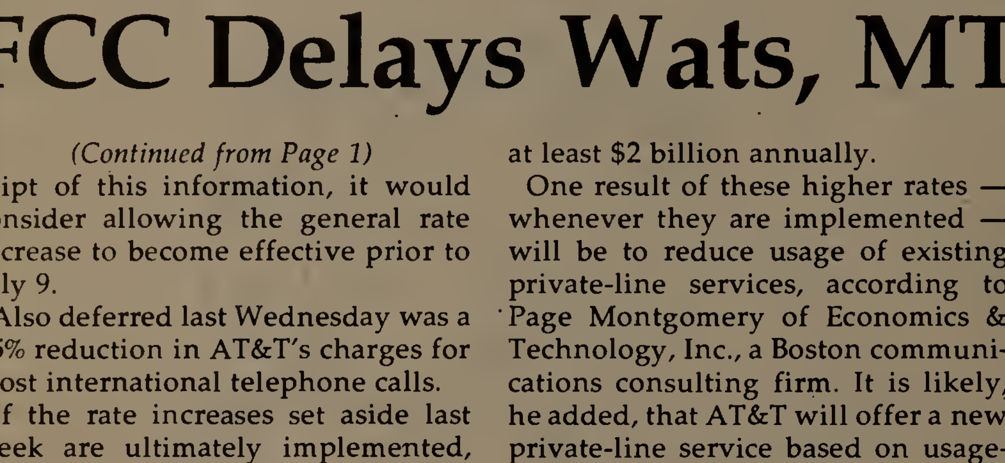
"Our CNS installation schedule is filled until the end of 1982," the SBS spokesman said, "which means that if a new customer signed up for the service tomorrow, he wouldn't be on the air until 1983."

In the case of Exchange Service, users can be hooked up rapidly — they will typically access SBS through dial-up telephone connections — but Exchange Service will not begin until next January and will not be fully implemented until 1983.

Another vendor likely to be affected by the pending rate increases is IBM. Its Systems Network Architecture (SNA) was designed for use in private data networks, rather than in public ones. But if, as a result of higher rates, the number of private networks shrinks, IBM will be motivated to implement a public data network protocol. In Europe, where this same sort of pressure has been generated lately, IBM is supporting X.25; it therefore appears likely that the pending rate hikes, when implemented, will force IBM to support X.25 in the U.S. as well.

The rate increases deferred by the FCC last week result partly from a commission decision last December requiring the phone company to use a new "interim cost allocation manual." The manual, according to AT&T, makes it more costly to provide private-line service. As a result, Bell requested a 16.4% increase in its private-line rates last February.

Early in April, the FCC boosted the company's allowable rate of return from 10.5% to a range of 12.75% to 13%, and this led to a second rate increase request. It called for a 16% increase in Wats, MTS and private-line charges. (The latter would first be increased by 16.4% to reflect the rate hike proposed in February and would consequently boost the new private-line rates 35% above existing levels.)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System/34, 38 Gain X.25

(Continued from Page 1)

as-expensive IBM 5251-12 communicating workstations, the spokesman maintained. The Series/1 within the Systar front-end system employs IBM's Synchronous Data Link Control (SDLC) protocol in a 9,600 bit/sec link to a System/34 or 38, which treats the front-end as a set of multi-dropped workstation clusters.

Gateway/34 interfaces up to 16 terminal/printer workstations to a single System/34 or 38 communications port, performing SNA to X.25 protocol conversions and conversions between the display formatting commands of 5251s and 3101s. The front end can serve up to four System/34s or System/38s as well as multiple public packet nets simultaneously.

Software for Gateway/34 costs $15,000, while hardware goes for another $16,000 to $28,000. Systar's address is Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

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Xerox Unveils High-Speed Fax, Promises Ethernet Compatibility

By Bob Johnson
CW New York Bureau

NEW YORK — Xerox Corp. last week announced two high-speed facsimile units that use information compression techniques, are compatible with Consultative Committee on International Telephone and Telegraph (CCITT) standards and will be Ethernet-compatible within the next two or three years.

The Telecopier 455 and 495 are part of what Xerox calls its World Class Telecopier family. According to the company, the 495 can send or receive a one-page letter to another 495 anywhere in the world in about 30 seconds. The Model 455 takes about one minute per page. Both units are also compatible with four other Xerox telecopiers, including Models 400, 410, 200 and 485.

The Telecopier 495 is a high-speed digital facsimile unit that combines thermal printing and digital compression techniques. Digital compression compresses information and white space into reduced transmission periods that save time and make the 495 the fastest facsimile terminal in Xerox history, the company noted.

The Model 495 meets CCITT Group 3 standards and can meet Group 1 and 2 standards with a compatibility option. The single-unit purchase price for the 495 ranges from $11,995 to $15,395, depending on configuration. Rental prices range from $370 to $495 a month.

The desktop Telecopier 455 utilizes standard analog transmission methods and analog compression, or what Xerox calls "white-line skipping." White-line skipping skips over the white space between lines of text, also saving time. Dal Berry, vice-president of the Office Products division, said, "A telecommunications organization can cut costs up to 50% because of white-line skipping."

The 455 is compatible with all other facsimile units conforming to CCITT Group 1 and 2 standards.

Facsimile Networks

The possibility of facsimile networks was proposed by Xerox, and Berry stated that it is now possible to set up a network with a central high-volume unit, regional medium-volume unit equipment and desktop remote units.

The company offers the 495, designed for high-volume unattended operation, as the central unit of a network. Depending on options ordered, the machine can answer the phone, adjust to speeds of sending or receiving units and disconnect when the last document has been received.

The announcement of these facsimile units rides on the heels of Xerox's Star Information System, [CW, May 4], demonstrated here recently. It is the second of four announcements scheduled by the company for 1981.

According to Berry, Xerox plans to tie the facsimile units together with the Ethernet coaxial cable network through a communications server. "The facsimile machines will become Ethernet-compatible within the next two or three years, depending on customer demand," he said.

The Telecopier 455 will be available for delivery in six metropolitan areas in the third quarter of 1981 and nationally in the fourth quarter, according to Xerox. The 495 will be available in selected cities in the fourth quarter of this year and throughout the country in the first quarter of 1982.

Correction

The Series 630 smart CRT terminal with a tactile feel keyboard shown in National Computer Conference Booths 542 and 543 (CW, April 27, Preview Page 53) is actually made by TEC, Inc.

South Carolina Process Seen Outdated, Disjointed

(Continued from Page 1)

powerful Budget and Control Board.

The two primary players are the Division of General Services (DGS) and Computer Systems Management (CSM). The model procurement code that governs purchases by those two agencies — in fact, governs all state procurement — was passed shortly after the turn of the century.

DGS is responsible for the management and development of South Carolina's telecommunications system, according to the report, which was commissioned by DGS and written by the Information Management Program Team of the Bureau of Governmental Research and Service at the University of South Carolina.

The report recommended DGS be given far-ranging powers over virtually every aspect of the state's information/communications technologies.

As the report noted, "In the area of telecommunications, General Services is unable to account, either in terms of an inventory, or in terms of expenditures, for all telecommunications equipment and services utilized by the state government."

Oversight Lacks

In fact, the report continued, "DGS' billings of the telecommunications budget amounts to approximately 29% of the total state budget for this resource.

Consequently, about 71% of the state's telecommunications expenditures lacks central government oversight."

In its role as a procurer of telecommunications services for some state agencies, DSG deals solely with Southern Bell Telephone and Telegraph Co.

Beyond that, the agencies also deal directly with Southern Bell, as well as some 37 other independent telephone companies.

Partly because DSG has only two persons dedicated to telecommunications engineering and design, Southern Bell frequently performs the majority of design and engineering for state agency systems, the report noted.

DGS lacks a master list of all state agencies and may only suggest they participate in the state system.

Recent Figures

The most recent telecommunications expenditures available (fiscal year 1979-1980) indicate $27,128,720 spent on operations and $772,646 on personnel. These "soft" figures may be as much as 30% low, according to the report.

CSM is responsible for the procurement and management of all DP equipment. It primarily concerns itself with large computers and DP personnel.

"Accounting for other components of data processing — such as for peripheral data processing equipment, software and communications lines — is very limited," the report observed.

CSM is also partially responsible for the procurement of data networks. In that area, all functional and technical specifications are based on Southern Bell and other independent telephone companies' capabilities for data networking.

According to the report, "CSM does not have a comprehensive inventory of all data lines used by the state, and . . . it bases all technical specifications on Southern Bell's networking capabilities. Thus, no effort is made to explore alternative and potentially more cost-effective networking possibilities."

Fiscal year 1979-1980 DP spending figures reflect $20,909,056 for operations and $21,499,201 on personnel. The report estimated these figures to be up to 50% low.

Office Systems

DSG is also responsible for the procurement of office system technologies. Its three components include traditional office activities and equipment, microfilm and microfiche technologies and printing services and equipment.

No specific standards, guidelines or procedures have been developed that detail how agencies should plan and procure office systems technology.

Operating expenses for office systems totaled $26,337,968 for fiscal year 1979-1980, while personnel expenditures ran to $89,480,975, 48.1% of the entire information/communications expenditure. The report claimed these figures may be as much as 30% low.

The general assembly here is moving to remedy the situation by revamping the model procurement code.

The proposed new code has been approved by the House of Representatives and is currently receiving its second reading in the Senate, where passage is considered likely.

The code embraces virtually all the report's recommendations, according to a DSG official.

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Doll Says Long-Range Plan Key to Survival

By Lois Paul
CW Staff

INNISBROOK, Fla. — "A company without an effective long-range plan is like a ship without a rudder. Sooner or later it drifts onto the rocks of hard times."

Dr. Dixon R. Doll, president of The DMW Group, emphasized the importance of strong organizational planning and the use of networks in his presentation entitled "Future Trends in Data Base/Data Communications" before the Software AG international users group meeting here last week.

The long-range plan involves a series of assumptions regarding new technologies and requirements that can be mapped out over the next five years, providing the company with solutions for present and future requirements, Doll said.

What often stymies these efforts at planning is the fear that companies cannot be sufficiently clairvoyant about the future. This can lead to inertia, which Doll described as "the key to disaster."

Companies do not have to be exactly correct about when new technologies will be available, he maintained. Planning forces them to at least think about the applications of new products. Included in each plan should be required periodic updates that can help to rework original estimates if these prove to be incorrect.

"The No. 1 problem in the industry today is the application backlog." After traveling through Europe, the Far East, the U.S. and Canada, Doll said he found everyone in the industry is concerned with this same thing.

"Most typical companies have a two- to three-year backlog of applications they have already justified and would profit from the development of if only they could implement them," he said.

Productivity Strategies

He listed such major information system productivity strategies as increasing the speed of application development with better methodologies; using nonprocedural languages the end user can generate directly; use of data analysis and design methodology independent of applications; use of relational data bases; and separating physical data base analysis and design.

A key to increasing productivity is starting with a matrix organization that considers end-user projects, he said, adding that the successful business entity will develop a strategic plan that permits distributed data processing to take place.

Doll cited the dependency of data structures and networks upon applications as one of the biggest reasons the application backlog exists in such magnitude. Maintenance costs between 50% and 90% of existing resources. It is necessary to separate these functions to improve productivity, he added.

Doll noted that office automation should be geared toward the executive and professional level, rather than the secretarial level, to be most effective in increasing productivity. He noted that Xerox Corp. is moving in this direction with its announcement of Star.

Office automation must focus on the professional and executive level, where the major corporate investment lies, "if we are to achieve our goal of 10% to 20% productivity improvement," he said.

The strategy to improve productivity also must include telecommunications and network services and new technologies.

Software AG Unveils Programming Machine

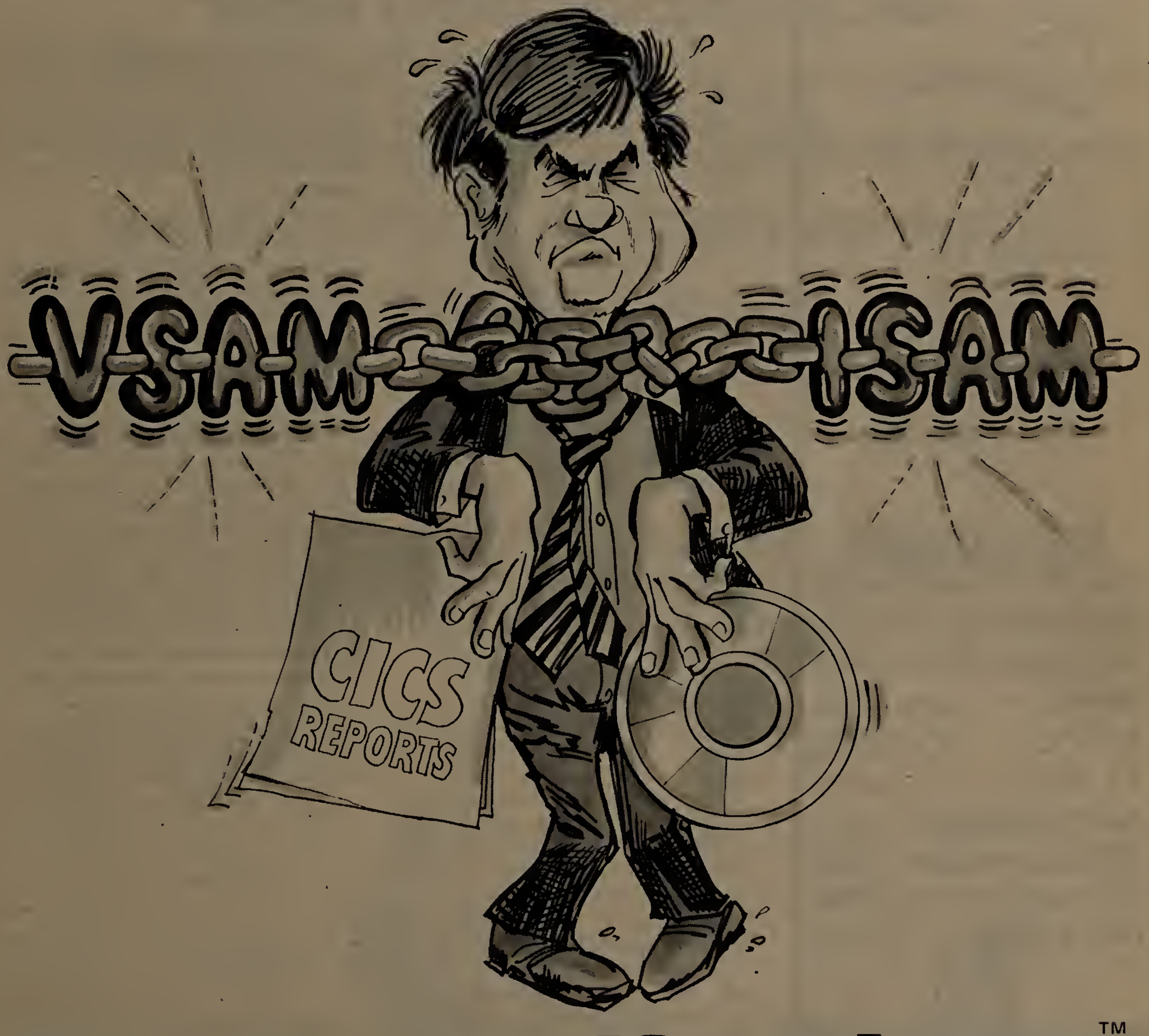
INNISBROOK, Fla. — Although its name is Software AG, the company previewed a piece of hardware it is calling a "programming machine" at its international users group conference here last week.

Peter Page, vice-president of Software AG in Darmstadt, West Germany, described the program machine as another tool to address the problems of decreasing programmer productivity.

The machine is based on Software AG's Com-Plete system, with the aproach being that of a teleprocessing monitor. Its purpose is to isolate program development from the host computer, Page said.

The programming machine reportedly is an IBM-compatible hardware/software system that will support Cobol, PL/I, Fortran and assembler and will contain Com-Plete. It is intended to off-load programming activity from the host computer using another Software AG product that is in the development stage, Channel-to-Channel Communications Systems.

According to Page, the programming machine will be able to be used in many configurations. He described it as "another component in the overall system we are going to be implementing within the next year."



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Vendors Seek Upkeep Methods

(Continued from Page 1)

considers equipment up or down; and techniques for preventive maintenance.

Industry Spotlight

Because of its clearly defined maintenance policies, HP is now able to offer users cost-saving service options. For example, the company used to only have one level of response time — four-hour, same-day service — but now users can opt for next-day service and receive a 25% savings over the same day-service option.

At the same time as defining its maintenance policies, HP is also providing users up-to-date maintenance techniques such as remote diagnostics. Remote diagnostics was originally used as a phone dial-up service for consulting on software problems, Warmington explained . However, HP has since expanded this use, building remote diagnostic capability into its HP 3000 system and is working on incorporating this feature into subsequent systems.

HP is implementing its remote diagnostic capability on a local, rather than centralized, basis and expects to have diagnostic computer equipment in local service areas in the near future, Warmington noted.

According to estimates of Input, Inc., a market research and consulting firm, remote diagnostics costs vendors from 2% to 15% of system development costs.

While vendors expect to lower costs of delivering maintenance services by using remote diagnostics, the technology is far ahead of users' willingness to adapt to such techniques, according to Input.

Early Advocate

Amdahl Corp. is another firm that early on saw the benefits of remote diagnostics. The firm was the first to build remote diagnostic capability into large-scale systems, according to a source at Amdahl. Rather than place remote diagnostic equipment in all local offices, Amdahl has opted to place these systems in two locations in the U.S. More and more users are dialing up these support centers, he noted. Most problems are with peripherals or applications because the hardware is highly stable, he said. The stability of the hardware was one reason Amdahl decided to build remote diagnostics into its equipment from the beginning.

Moreover, Amdahl has cross-trained its field maintenance personnel so that all services engineers provide both hardware and software maintenance.

Sperry Univac has a well-developed centralizd remote software maintenance program staffed with 20 people running out of its Roseville, Mich., office. Although software service is still delivered on a local basis, remote diagnostics lends itself to a central approach, noted John W. Champine, group manager of marketing for central software support.

Univac keeps a central data base of all known software problems and corrections for its systems.

USER ACTIVITY	PERCENT OF RESPONDENTS	
	CURRENTLY ACTIVE	WILLING TO CONSIDER
INSTALL EQUIPMENT	21%	9%
PERFORM DIAGNOSTICS	42	20
DEPOT MAINTENANCE	11	15
PERFORM HARDWARE MAINTENANCE	7	7

The chart above, from Input, Inc., details user receptivity to self-maintenance techniques. Input compiled the chart from 912 responses to its 1980 user panel survey.

The company sees remote diagnostics as a way of coping with an increasingly expanding customer base. In one year the company has as many accounts for its 1100/60 system as it did in three years for its 1100/80 system, Champine noted.

Comus Manager

Univac also provides an on-site system software manager called Comus that keeps track of systems' levels installed and registers corrections. Within six months, Champine expects Univac will be able to down-line load software systems' fixes electronically.

While vendors are viewing remote diagnostics as a cost-saving measure, users are not interested in becoming involved with the details of maintenance, except where alternatives are very clear and graphic, Input observed. However, overall Input found users had positive attitudes toward remote diagnostics, but found field engineers were concerned about giving up the personal contact feature of maintenance.

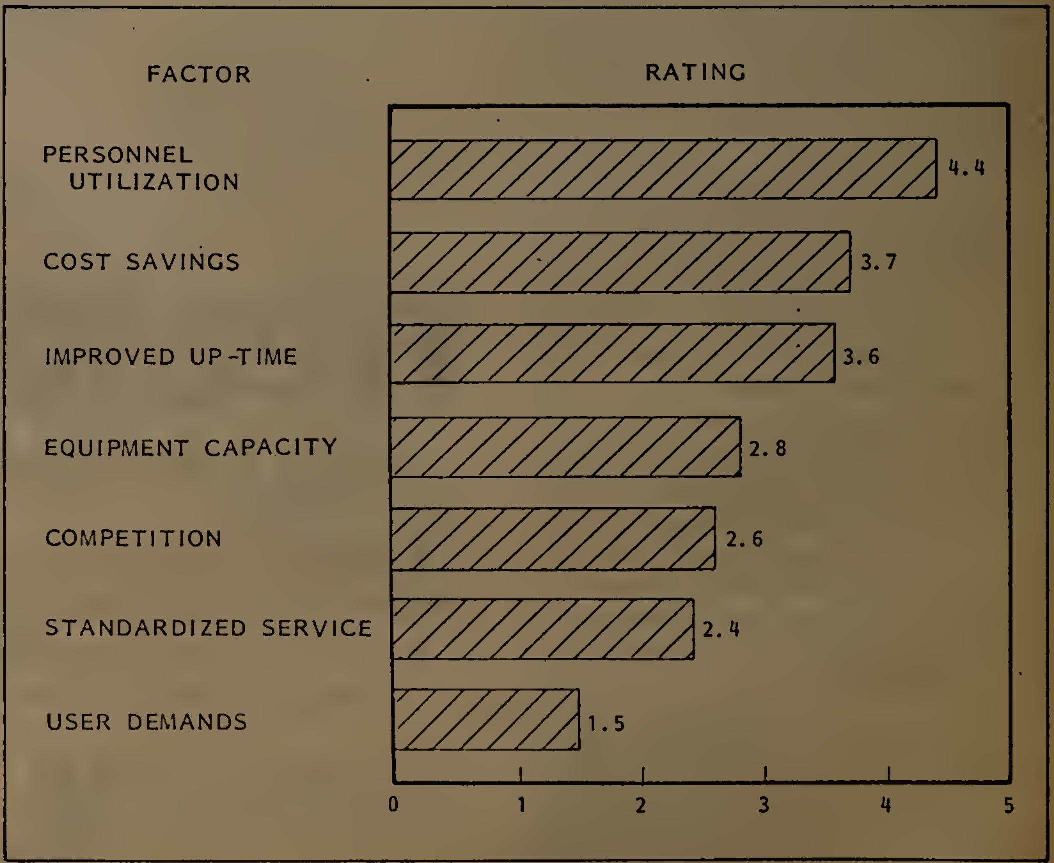
Other maintenance cost-saving measures being explored by vendors are user self-maintenance, including installation; user-initiated performance diagnostics; actual repair; or return of defective parts to a vendor's depot.

Although user resistance to self-maintenance exists today, Input found it at about half the level it was in a survey performed two years ago.

However, on a widespread basis, computer users have not been willing to service equipment themselves, according to Stephen J. Keane, president of Sorbus, Inc. It is not traditional in the industry, he said. But users appear to be willing to make use of depot service for physically small equipment or equipment that is used in noncritical applications, third-party maintenance vendors observed.

HP recently started field repair centers for terminals and small desktop units last year. Users can realize savings on maintenance costs of up to 60% if they bring the equipment in for servicing, HP's Warmington noted.

The entire issue of user self-maintenance could become irrelevant if vendors build user maintenance features into their products, Input noted. One example of this type of product is IBM's 3101 terminal. Terminal products are excellent prospects for self-maintenance because of their communications features.



The chart above, also from Input, shows how vendors rated the benefits gained by using remote diagnostics. The ratings were made on a zero to five scale, with zero representing " no importance" and five representing "maximum importance."

Offers Large Revenue Potential

Maintenance Becomes Industry's Cinderella

By Marcia Blumenthal
CW Staff

WALTHAM, Mass. — No longer the stepchild of the marketing department, maintenance service is becoming the Cinderella of the computer industry as companies discover the glass slipper contains a sizable portion of their total revenues.

A recent survey of 24 major computer industry vendors by International Data Corp. (IDC) revealed maintenance is achieving status within organizations.

Some 78% of the companies surveyed responded that the maintenance department now reports to either the president of the company or a group vice-president, IDC noted. And 75% of these companies also disclosed that the senior field service executive carries the title of vice-president.

Why the sudden elevation of maintenance services? At a time when most vendors are seeing profit margins squeezed, maintenance provides an added source of revenues and profits.

On the average maintenance brings in 8% to 20% of an equipment manufacturer's revenues, IDC found. IBM's recent first quarter financial report noted that revenue from service increased 27% from the same quarter a year ago.

Market research and consulting firm Input, Inc. estimated 1980 maintenance revenues at $6.4 billion, more than double those of the total semiconductor industry. Input forecast 1985 maintenance revenues will be $13.2 billion and this industry segment will employ 176,000 people.

Profit Center

In order to control the maintenance segment of the business, most companies surveyed (82%) now treat field service as a profit center, the report noted.

Now that maintenance service has become a profit center, the organization of field service groups is changing. The major difference is the growing emphasis on marketing and finance. The ratio of field service personnel to field sales personnel at the companies varied from 4:1 to 1:1 for end-user-oriented field services organizations compared to 20:1 to 6:1 for third-party maintenance companies.

Industry Spotlight

Some vendors are finding the quality of maintenance is an excellent selling point to prospects.

With the switch to the profit center concept, field maintenance organizations are becoming more price sensitive. Some companies are increasing maintenance charges to properly reflect costs and charging for services that were once "free," a move that has not been welcome to the marketing organization, which formerly was able to go to great length to satisfy a good customer.

In general, past pricing practices have been to charge users 8% to 12% of the purchase price of hardware for annual maintenance. With the advent of more reliable and lower cost

(Continued on Page 13)

Recent Studies

Many market research and consulting firms have performed surveys on the maintenance portion of the computer industry. Among the recent reports:

- "Third Party Computer Maintenance Market," offered by Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038, for $1,250, contains a discussion of trends in this segment of the market as well as a listing and short profile of all firms in the third-party market with revenues of at least $1 million.
- International Data Corp. will bring out a major study on maintenance trends in the near future. Besides focusing on industry trends, this report includes a detailed discussion of the maintenance policies and organization of Honeywell, Inc. , Digital Equipment Corp., Data Terminal Systems, Inc. and Nixdorf Computer Corp.

The report is priced at $995, but is available free of charge to clients of the firm's Corporate Planning Service. IDC is located at 5 Speen St., Box 955, Framingham, Mass. 01701.

- Input, Inc. offers four reports on maintenance issues. The reports — "Marketing Field," "1980 Field Service Annual Report," "Opportunities in User Self-Maintenance" and "Trends in Remote Diagnostics" — are priced at $4,000 each, but are free to subscribers of Input's corporate information service. Input is located at Suite 600, 2471 E. Bayshore Road, Palo Alto, Calif. 94303.

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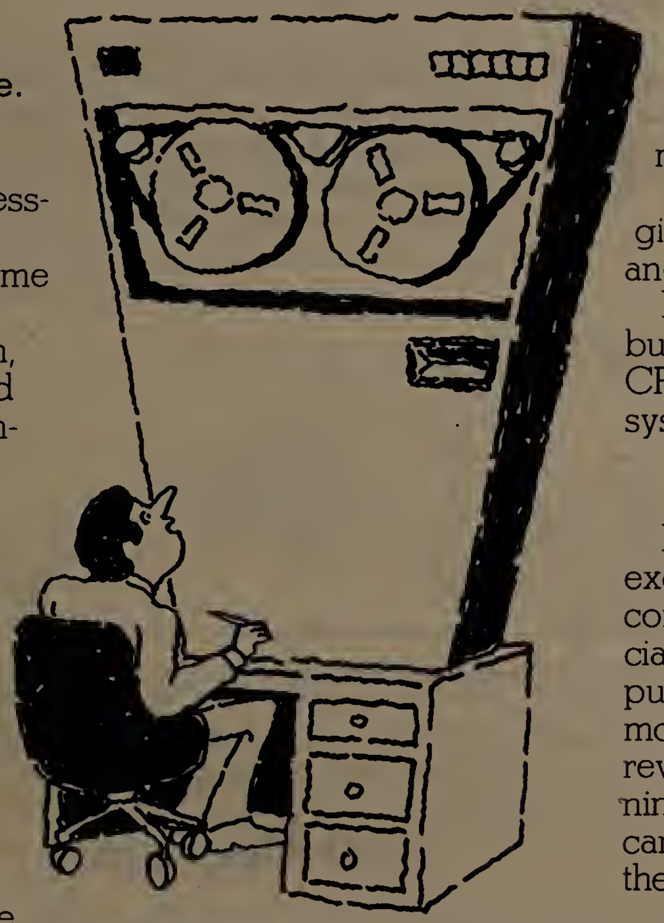

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Two Third-Party Maintenance Firms Profiled

Industry Spotlight

• *TRW*

By Marcia Blumenthal
CW Staff

FAIRFIELD, N. J. — With revenues last year estimated at about $102 million, TRW Inc.'s Customer Service Division is the largest third-party maintenance firm in the U.S.

Some 80% of the division's revenues are from maintenance provided to about 30 manufacturers who contract with TRW to provide service to their end users.

TRW has about 2,800 field service engineers working out of more than 200 locations.

Although the firm services mainframes and various peripheral equipment, it just began maintaining IBM equipment last year. Other major vendors served include Digital Equipment Corp., Data General Corp., Docutel Corp., Applied Digital Data Systems, Inc. and Hazeltine Corp.

Started in 1970, TRW took over the maintenance of Singer Co.'s Business Machines Division in 1976, resulting in about a 10-fold growth almost overnight.

Although hardware vendors are engineering more reliability into their equipment, that equipment is not necessarily more serviceable, observed John Harnett, director of planning and development at TRW's Customer Service Division.

This is because users are relying more heavily on computer equipment in their businesses and have a more complex group of devices on site than they have had in the past, Harnett continued. So even though a terminal, on the average, may require only half a service call per year, users have many more terminals on site than previously, and their maintenance needs have escalated.

Like other large third-party maintenance vendors, TRW has the capability of performing remote diagnostics and is training users to maintain their own equipment, both viewed as cost savings measures. However, because hardware service maintenance is a relatively small portion of a user's budget, the DP manager is usually more concerned with uptime than cost of service, Harnett noted.

But from TRW's perspective cutting costs is essential to retaining competitive maintenance prices. Since 1976 TRW's maintenance charges have advanced slightly — only between 6% and 8% annually.

• *Sorbus*

FRAZER, Pa.— Although not the largest third-party maintenance company, Sorbus, Inc. is probably the most well-known firm in the industry because of its emphasis on end-user service.

The company blankets the U.S., dispatching more than 900 field service engineers from 160 locations.

While computer equipment vendors are just starting to wake up to the lure of profits to be made providing maintenance, third-party maintenance firms have had to structure their businesses from the start as profit centers.

Although Sorbus usually charges 20% to 30% less for service than IBM, price is not the major consideration for users selecting the third-party maintenance route.

"Sorbus can't sell an IBM user on lower prices alone; technical know-how and price are the winning combination in the third-party maintenance market," noted Stephen J. Keane, president of Sorbus.

With hardware costs coming down rapidly, Sorbus has been under the gun to keep maintenance costs low. "We try to avoid people-oriented solutions to maintenance," Keane said.

While new industry trends such as remote diagnostics and user maintenance have their place at Sorbus, Keane thinks remote diagnostics is appropriate for heavily communications-oriented products. Moreover, the technique is dependent on hardware vendors building the diagnostic capability into the equipment.

The prospect of users maintaining equipment is a possibility, but Keane noted it is not traditional in the computer industry and has a limited attraction to users.

Dedicated largely to servicing IBM equipment, Sorbus is selective about the equipment it services, which helps the bottom line. "Generally we lag the marketplace by two to three years," Keane noted.

One way Sorbus has made its business more efficient is by creating an on-line data base parts tracking system. The software for this system cost $800,000 to develop. The system tracks 75,000 line items catalogued under the 50 different manufacturers' parts numbering systems, and allows the company to track parts to 3,200 locations.

Although Keane said the company could absorb 20% more field engineers annually, the company's attrition rate of about 15% is about half the maintenance services industry average.

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Growing $390 Million Industry

Third-Party Upkeep Seen Key to Mixed Nets

By Marcia Blumenthal
CW Staff

As sophisticated users continue to mix and match computer equipment, maintenance of that equipment becomes more complicated.

During the past five years, users have been building communications networks with a variety of hardware. " A large network may include hardware from as many as 20 vendors, which builds in a lot of finger pointing," observed John Harnett, director of planning and development for TRW, Inc.'s Customer Service Division.

Third-party maintenance — maintenance service offered by a company other than the equipment manufacturer — is one way users can cope with mixed-vendor headaches. And as new manufacturers seemingly crop up overnight with tempting innovative product offerings, third-party maintenance becomes an increasingly attractive means of dealing with mixed-vendor configurations. This is because most young companies do not have the resources to establish an extensive services network.

As a result of these market phenomena, third-party maintenance today is estimated to be a $390 million annual industry, growing at about 15% a year, according to Frost & Sullivan, Inc. (F&S), a New York City-based market research firm.

Like the computer industry, the third-party maintenance market is dominated by a few large companies. TRW and Sorbus, Inc., a division of Management Assistance, Inc. (MAI), control about 40% of the market.

Typify Segments

TRW and Sorbus typify the two segments of the third-party maintenance industry. Sorbus, the most widely known company, primarily services end users. Some 70% of the company's $55 million revenue last year was derived from servicing mostly IBM equipment, with the remainder coming from servicing the equipment of Basic Four Corp., another subsidiary of MAI.

By contrast, TRW contracts with some 30 manufacturers to provide service to end users under those manufacturers' names. TRW's service revenues were estimated to be $102 million for its last fiscal year.

The third-party maintenence portion of the industry is considered to include about 100 companies with revenues of $1 million or more. More than 40% of these companies have been formed since 1976, F&S noted. However, TRW's Harnett said there are about another 300 or so companies with revenues less than $1 million, which makes the industry a lot larger than $390 million.

The third-party maintenance market is fragmented, with many companies servicing only specific geographic areas.

The provision of direct end-user service is the most promising segment of the market, F&S maintained. Not counting the manufacturer portion of TRW's revenue, F&S said the end-user segment accounted for 68% of the industry revenue last year. However, other observers in the industry disagree. Those third-party companies that concentrate on end-user maintenance could find themselves out in the cold as vendors place more importance on maintenance revenue.

The fastest growing segment of the third-party maintenance market is for peripherals and terminals, F&S noted. (See accompanying chart.)

Oddly enough, the major contributor to the growth of third-party maintenance service is the U.S. government, according to Datapro Research Co. Formal government policies encourage the use of third-party maintenance; and the government is one of the largest users of independent maintenance services.

While the government is apparently a great fan of third-party maintenance, manufacturers, even those who provide part of their service through third-party companies, often think third-party service is inferior, F&S found.

Industry Spotlight

Of those manufacturers, 68% responded their companies' response time was better than that of third-party maintenance companies; 83% said their own repair time was better; and 77% said the skill of the in-house repair technician was better.

However, F&S's survey discovered there was a significant disparity between how manufacturers and users view the service of third-party maintenance vendors.

Of those users surveyed, 68% said the response time for third-party maintenance firms was as good as or better than that for manufacturers; 47% said repair time was equal to or better than that of equipment vendors; and 61% considered the skill of the repair technician was equal to or better than that of the manufacturer's field staff.

Estimated Revenues in Third-Party Maintenance Market[1]

Market Sector	1980	1981	1982	1983	1984	1985
Mainframes	40	42	44	46	49	52
Minicomputers	60	65	70	77	85	92
Peripherals	135	150	165	180	190	210
Terminals	155	175	195	210	235	265
Totals	390	432	469	510	559	620

Source. Frost & Sullivan, Inc.

[1] Dollar amounts in millions; constant 1980 dollars rounded to nearest $10 million.

Cinderella Grows Up

(Continued from Page 11)

hardware, such as the new midrange IBM 4300 equipment, annual service contracts are pegged at 2% of the purchase price.

While some maintenance percentage rates are dropping, those for older equipment are rising, IDC found. For example, the annual service contract price for the 10-year-old IBM 3211 printer is about 22% of the purchase price.

Companies use a variety of techniques to establish prices for service. In general, however, IDC found pricing of services is a combination of cost estimates to provide that service and market conditions, including prices charged by competitors.

Users are increasingly factoring in "cost of ownership" as a parameter.

In addition to price, service response time is crucial to running a profitable maintenance organization. In general, IDC found 37% of mainframers surveyed offered response times of less than two hours. A third of the minicomputer companies and terminal makers offered two- to four-hour response times, with 30% of stand-alone product makers offering next half-day response time.

As a means of monitoring satisfaction with service, 75% of the vendors surveyed use customer satisfaction surveys. About 25% of these companies have instituted the formal surveys within the past two years.

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Boston	WXNE	25	Wed.	11:00 PM**
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*Check local listings for time.
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NAS Petitions USSR to Release DP Scientist

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — In a formal statement released May 5, the National Academy of Sciences (NAS) has petitioned the Soviet Union to release imprisoned Russian computer scientist Victor Brailovsky and to allow him and his wife to emigrate to Israel.

In its statement, the academy's Committee on Human Rights claimed the 45-year-old cybernetics specialist was falsely charged last November with defaming the Soviet political and social systems through his activities in organizing the Jewish "refusnik" scientist community in Moscow.

Brailovsky and his wife Irina, also a computer scientist, have been denied employment since they applied for emigration to Israel in 1972, according to Western reports. Their emigration application was denied because the Soviet government claims Irina Brailovsky had access to state secrets in a previous job.

Letter to Dobrynin

The NAS committee transmitted its request to the Soviet government in a letter to Soviet Ambassador Anatoly Dobrynin following formal endorsement by the governing Council of the Academy May 4.

The committee expressed concern over reports that Brailovsky, detained in a Moscow prison, is in poor health.

Although well known in scientific circles, the plight of Brailovsky has until recently been overshadowed by the situation of Anatole Sharansky, the Soviet computer scientist convicted in 1978 of spying for the U.S. and sentenced to 13 years in prison.

Sharansky's arrest led to the formation of an ad hoc group of Western scientists, called Scientists for Orlov (an imprisoned Russian physicist) and Sharansky, which has organized an embargo on scientifc exchanges with the USSR protest over the treatment of Soviet dissident scientists.

Like Brailovsky, Sharansky is said to be in very poor health. His case has been popular with several members of the U.S. Congress who regularly mark anniversaries of his arrest and conviction by calling for his release.

Western Union, RCA Worldcom Lower Datel Charges 28% to 56%

WASHINGTON D.C. — Western Union International has reduced its international datel charges 28% to 56%, and RCA Worldcom has done likewise. As a result, the cost of a three-minute call between the East Coast and the UK is now $5.25 instead of the former $12.

Another change further enhances the service. Last September, as a result of proceedings at the Federal Communications Commission , restrictions on the use of datel circuits for voice transmission were lifted. Previously, voice communications had to be incidental to transmission of data; typically, it was limited to exchange of call setup and termination information. Now, separate voice and data messages can be transmitted over datel circuits.

Datel, which operates at speeds up to 9,600 bit/sec, typically handles keyboard-entered and facsimile messages.

Corrections

Contrary to the statement in the *Computerworld* product spotlight on financial software systems [CW, May 4], a spokesman for Software International Corp. said his firm's General Ledger and Financial Reporting System does operate with fixed-block architecture (FBA) in all currently available hardware environments requiring it.

Intertel, Inc. [CW March 16] recently moved to 6 Shattuck Road, Andover, Mass. 01810.

Elec-Trol, Inc. has selected Litton Mellonics Information Center as its sole vendor for all information processing requirements [CW, March 23]. Litton Mellonics remains the major data processing center and part of the Litton Industries organization.

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Seek Feedback

Managers Told to Implement EMS Gradually

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Computing managers should implement electronic mail systems (EMS) in small steps, seek continuing feedback during their development efforts and be prepared to revise their installation plans repeatedly to meet unforeseen problems or changing user specifications. So said Luis Hurtado-Sanchez, manager of Hewlett-Packard Co.'s office utilities and user support organization.

Speaking at a recent electronic mail seminar, Hurtado-Sanchez urged systems managers to limit the scale of their EMS development projects, at least during the early going. He also advised managers to prevent their installation plans from becoming unduly rigid and to keep their systems options constantly open.

"Your planning assumptions will be contradicted practically every day," Hurtado-Sanchez said during his April 29 presentation. "The easiest way to fail in implementing an electronic mail system is to undertake a project in which every last installation detail is planned from the outset."

In other advice, Hurtado-Sanchez warned would-be EMS implementors not to scrap their existing data communications and message switching facilities until they have made absolutely sure their replacement systems are in perfect working order.

"Use a parallel systems approach," the speaker advised about 65 listeners. "There's no established body of knowledge to guide you in developing an electronic mail system, nor is there any body of theory explaining what an EMS does or how it should do it."

Thus, he added, EMS developers should proceed with a "sense of experimentation" and be willing to change their course in midstream if their efforts suddenly go awry.

Comsys Network

Hurtado-Sanchez's knowledge of electronic mail matters comes from his company's extensive experience in developing and installing a worldwide data communications network for HP's own internal use. Known as Comsys, the network was designed during the late '60s to allow any terminal operator at either a domestic or international HP location to communicate with any other operator anywhere in the HP world.

Although based on two Amdahl Corp. 470V/8s and one 470V/7, the network is composed primarily of HP hardware, including nearly 200 of the company's 3000 series processors and a roughly equal number of 1000 series machines. In the near future, the firm plans to install an additional 60 of the 3000s as well as 10 more 1000s, Hurtado-Sanchez said.

From its hub at HP's corporate headquarters in nearby Palo Alto, Comsys last year transmitted a total of 550 billion characters' worth of memos, bulletins, messages and other electronically stored documents. In 1979, by contrast, the network sent an average of 140 million characters per day, compared to 21 million characters per day in 1973.

First installed during the early '70s, Comsys was intended to fulfill four primary missions:

- Serve as an electronic mail network.
- Process text.
- Provide tools for boosting programmer productivity.
- Aid HP's user-support group.

To meet the first of the four major Comsys objectives, the company recently began developing a network that will eventually allow users to transmit mail to and from individual mailboxes. A scaled-down version of the contemplated network is currently being installed as a pilot project, Hurtado-Sanchez said.

One of HP's main goals in implementing Comsys is to equip most of the firm's professional, administrative, clerical and secretarial personnel with their own on-line terminals. "Eventually, we want to get our people accustomed to relying on terminals instead of using the telephone to send memos and other internal correspondence," the HP executive said.

Future Expansion

Within the next year or two, the computer equipment and instrumentation manufacturer expects to expand its existing Comsys network with the installation of an additional data communications system. In addition to routing messages to their intended destinations, the proposed system will be able to decide whether recipients have their own personal terminals, what model of terminal they use, what types of transmissions they typically receive and when they want those transmissions sent.

But to implement such a system, HP will first have to overcome a raft of difficult technological hurdles. It will also have to solve the even stickier problem of user resistance and fear of change.

Wang Institute Unveils Summer Course Schedule

TYNGSBORO, Mass. — The Wang Institute of Graduate Studies has announced its summer schedule of 11 intensive, short computer science courses to be given here, at Stanford University and at the University of Santa Clara.

The courses run between three to 10 days and are hosted by computer science faculty members from universities and colleges nationwide.

Topics to be covered include program and system development, operating systems as programming environments, compiler construction, software quality assurance and maintenance, distributed data base management systems, Ada, Lisp, structured programming and program proving and a full-week data base management systems seminar.

Most of the courses require some degree of computer science experience.

Seminar costs range from $300 to $900, and more information can be obtained from Eastern Institute in Computer Science, Wang Institute of Graduate Studies, Tyng Road, Tyngsboro, Mass. 01879 for the Eastern sessions and from Western Institute in Computer Science, P.O. Box 3217, Fremont, Calif. 94538 for the California sessions.

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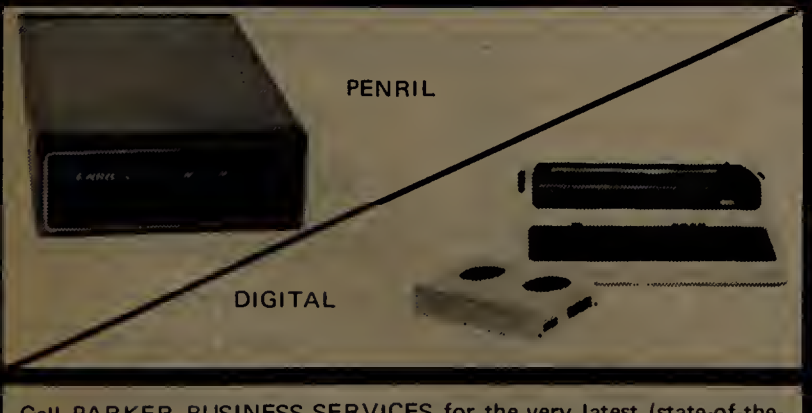

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	TI787 Portable KSR, 120 CPS	2,845	273	152	102
	TI810 RO Printer	1,895	182	102	69
	TI820 KSR Printer	2,195	211	117	80
DATAMEDIA	DT80/1 CRT Terminal	1,695	162	90	61
	DT80/5 APL CRT	2,095	200	112	75
	DT80/5L APL 15" CRT	2,295	220	122	83
LEAR SIEGLER	ADM3A CRT Terminal	875	84	47	32
	ADM31CRT Terminal	1,450	139	78	53
	ADM42 CRT Terminal	2,195	211	117	79
HAZELTINE	1420 CRT Terminal	945	91	51	34
	1500 CRT Terminal	1,095	105	58	40
	1552 CRT Terminal	1,295	125	70	48
TELEVIDEO	920 CRT Terminal	895	86	48	32
	950 CRT Terminal	1,075	103	57	39
NEC SPINWRITER	Letter Quality, 55/15 RO	2,895	278	154	104
	Letter Quality, 55/25 KSR	3,295	316	175	119
QUME	Letter Quality KSR, 55 CPS	3,395	326	181	123
	Letter Quality RO, 55 CPS	2,895	278	154	104
HEWLETT PACKARD	2621A CRT Terminal	1,595	153	85	58
	2621P CRT Terminal	2,750	263	154	99
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Experts Predict

Long-Haul Users to Face Peripherals Problems

By Brad Schultz
CW Staff

Long-haul data communications users, warned by AT&T to expect performance problems as the carrier routes more data to orbiting satellites, will mainly notice those problems at remote peripherals such as CRT terminals, experts have told *Computerworld.*

Although AT&T has named certain modems as the source of future transmission difficulties, these experts expect terminals and printers to show how bad things are by displaying invalid data, losing lines of text in output runs, or spewing blocks of data redundantly. The faster the remote printer, the worse the effects, one expert stated.

AT&T has warned its customers to expect propagation delay and echoes as the carrier shunts massive volumes of Wide-Area Telecommunications Service (Wats) and Message Telecommunications Service (MTS) traffic from earth-bound to satellite circuits in the next year [CW, March 23].

Bell's warnings, conveyed in terse "Dear Customer" letters signed by account managers at regional telephone companies, pertain to users of its 201, 202 and equivalent half-duplex modems. Full-duplex modems will be unaffected, the letters maintained.

A propagation delay of less than a second would pose no problem for most users if their systems were built to expect it. Longer delays would affect terminal response times significantly enough to disturb interactive DP.

Effects of Delays

While AT&T has predicted delays no longer than about three quarters of a second, the systems affected may not be adequately prepared, experts told CW. A number of major network architectures have software, typically resident in communications processors, that can handle delays of a few hundred milliseconds, they said, but not the 700 msec mentioned in the ominous "Dear Customer" letters.

These architectures — such as IBM's Systems Network Architecture, Digital Equipment Corp.'s Decnet and Sperry Univac's Distributed Communications Architecture — could be retrofitted for the new situation, the experts said, but until this is done, the sudden shift of data to satellite circuits could be devastating. Just how devastating may not be clear for years after the fact, one observer pointed out.

The consensus of experts CW polled was that few users can, on their own, adequately retrofit facilities by Dec. 31, the last day the delays and echoes can be avoided, according to letters mailed by Bell companies for more than a year.

In Cedar Rapids, Iowa, telecommunications engineer Jim Mosel of Norand Corp. anticipates problems with terminals that initiate satellite-carried communications. These terminals will experience what is called "first transmission echo," Mosel told CW. Such echoes occur as the sender terminal automatically determines whether data can arrive at a receiver terminal, typically thousands of miles away, in valid condition.

It does this by sending a test block of information. The receiver's terminal is supposed to transmit this block back to the sender, where it is compared with a copy of the block that was sent.

But the propagation delays that apparently await most of Bell's long-haul data communications customers may cause sender terminals to confuse the test blocks with true data or other control information, regurgitating them as echoes and onerously padding the volumes of data that users pay to transmit or receive.

Mosel said that Norand, a manufacturer of hand-held and point-of-sale terminals, was concerned about the impact the problems described in the "Dear Customer" letters may have on its customers, which depend heavily on long-haul communications. Mosel considered acquiring devices marketed by Gaithersburg, Md.-based Telecommunications Techniques Corp. (TTC) that reportedly can simulate the conditions that await Bell Wats and MTS customers.

According to a TTC spokesman, users can plug equipment into the vendor's Model 1010B, 1020B and TCS-600B simulation devices and find out what happens when propagation delays and echos are imposed [CW, April 13].

But Mosel said the TTC gear was simply too expensive for his company's communications budget this year. According to him, AT&T has not proved very helpful in describing solutions to the anticipated problems.

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Satellite Data Links Seen Poor Terrestrial Substitute

By Brad Schultz
CW Staff

In *Communications Satellite Systems* (Prentice-Hall, 1978), noted data communications writer James Martin has identified three disadvantages in replacing terrestrial with satellite data links — all three resulting from increased propagation delay:

- "Throughput can be degraded, sometimes to a half or less of that with an equivalent terrestrial circuit."
- "Mechanisms that regulate the flow or pacing of data can be interfered with, in some cases causing a device such as a remote printer to cease functioning correctly."
- "Response time can be lengthened, sometimes by about half a second, but sometimes by several seconds if a technique like polling is used."

Propagation delay (often called time delay) need not impair data transmission, Martin noted in the book, if the delay is properly anticipated in system design and protocols.

Martin wrote prophetically that "a problem may arise on public data circuits if the common carrier can occasionally switch to a satellite link instead of a ground circuit. If this possibility exists it needs to be considered when a data transmission system is designed."

A constant delay of about 540 msec is inevitable with interactive DP carried by satellite, Martin pointed out, because the round trip for data signals traveling at the speed of light (186,000 miles per second) is roughly 50,000 miles. (Twice the ratio of 50,000 to 186,000 is nearly .540).

Martin declared that a two-way delay of 540 msec can wreak havoc with printer controllers, which tell sending machines when to slow or hasten flows of data to printers, so that unnecessary idling or spillage from overflowing buffers can be avoided.

But Martin's figure of 540 msec only covers the exchange of signals between earth stations. Informed experts say, from the standpoint of terminal equipment (where machines interface with humans), total delay includes another 150 to 250 msec.

The additional time segment accounts for data's passage through the wiring and hardware configured between the terminal and the earth station on either end of the satellite link, as well as passage through the orbiting satellite.

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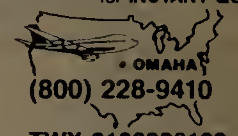

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IBM Opens Bay Area Store, Its First West Coast Outlet

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM early this month opened its first West Coast retail store here in an effort to cut its sales costs and boost its office products and desktop computer orders.

The store, which IBM refers to as a "retail product center," is the company's third such outlet in the U.S. and its fifteenth throughout the world. IBM's two other domestic retail stores opened their doors for the first time late last year in Philadelphia and Baltimore.

In addition to carrying a large selection of noncomputerized office products and accessories like electric and electronic typewriters, dictation machines, photocopiers and cassette recorders, the IBM West Coast retail store will stock the company's latest desktop computer, the Model 5120.

The outlet will also carry IBM's Model 3101 display terminal and its Model 5260 point-of-sale retail system as well as a selection of terminal tables, magnetic media and printer supplies, the company said.

Complementary Effort

Like its sister facilities on the East Coast, the industry giant's latest retail store will complement the company's existing sales efforts, according to Dr. Daniel McGlaughlin, marketing vice-president for IBM's Office Products Division.

In essence, the store and others like it will reportedly provide the firm with an additional vehicle for reaching small businesses and other potential buyers of low-cost office equipment.

IBM chose this city as the site for its first West Coast retail store because of the community's high density of small business activity, McGlaughlin explained. The store, which formally opened its doors for business on May 4, lies in the heart of the city's downtown financial district, just a stone's throw away from IBM's local Business Computer Center.

The area surrounding the store probably boasts as large a potential market for IBM office products as the locale served by the company's Philadelphia outlet, McGlaughlin said.

IBM views its retail store here as just the first in a whole series of such West Coast outlets, the marketing vice-president added. However, he declined to say exactly where or when the future West Coast store openings would occur.

McGlaughlin also declined to reveal how much IBM expects its retail store here to gross during its first year of business, nor would he disclose the outlet's projected sales for specific equipment models.

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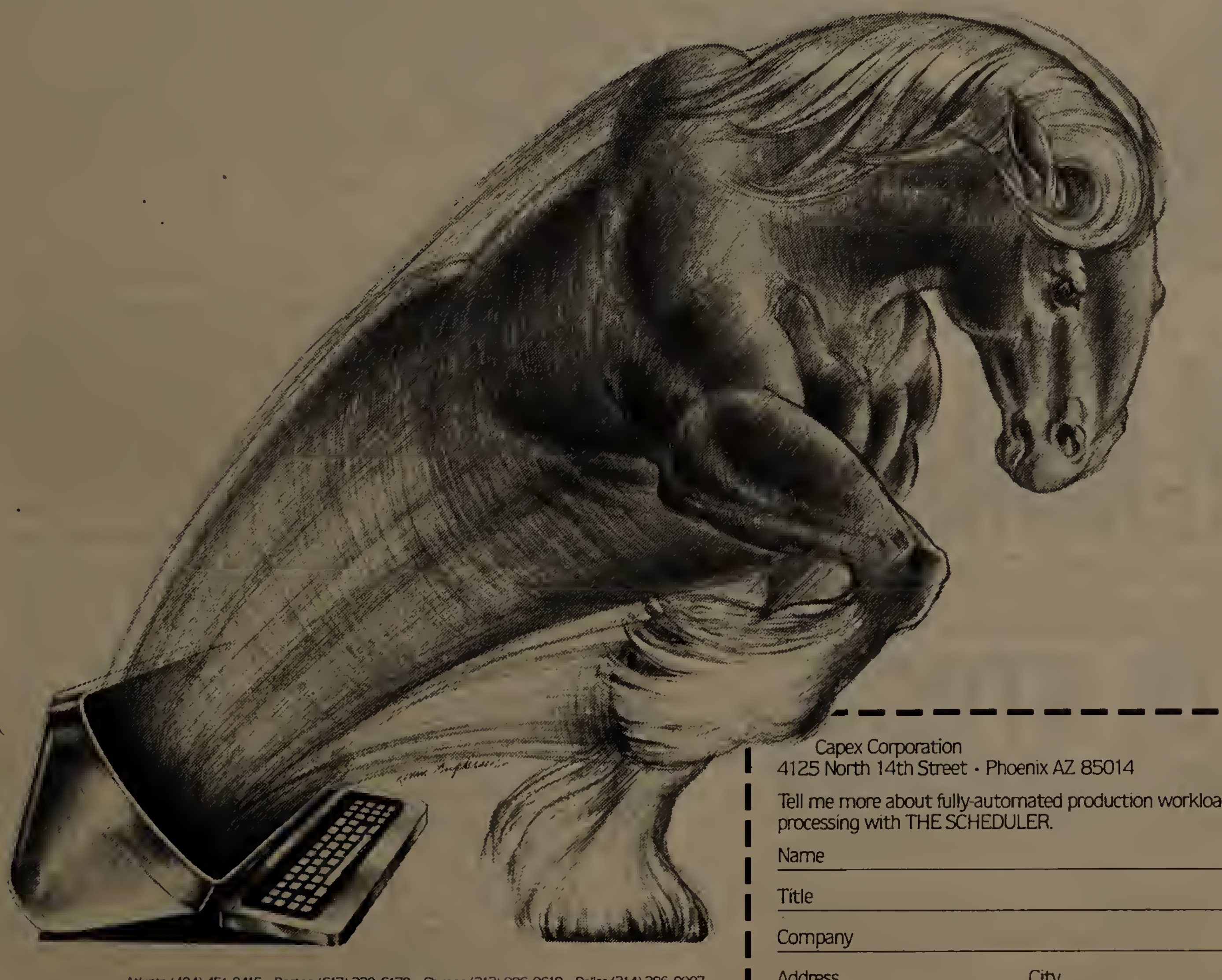

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First, Determine Objectives

Training Managers Get Budget Consent Tips

By **Bruce Hoard**
CW Staff

CHICAGO — Training managers who want to ensure that their budgets receive management approval should identify and produce training programs for which management sees a visible need.

"If managers want the budget, they're going to pay for it," according to Vince Vinci, instruction manager of information services for Standard Oil of Indiana.

The road to budget approval starts with determining program objectives, which is itself a management activity. After that, it is up to training managers to determine the specific programs and projects that will best meet management objectives, Vinci told attendees at the recent Deltak international training conference here.

That means evaluating the proper tools and techniques and deciding how they should be used, he added.

One helpful device is the Training Advisory Committee, composed of department heads from areas which will be served by the training function. Committee members should give feedback on current programs and make suggestions for future ones, he observed.

Such meetings may be held on a quarterly basis. It is important to remember the advisory committee is only advisory and should not formulate mandates, Vinci stressed.

'Wish List'

An educational requirements survey is another useful tool. This "wish list" is sent to the entire potential training audience to get a reading on what is needed by various elements of the organization.

He warned against unquestioned reliability on the requirements survey because certain managers responding to it may be more reliable than others and needs expressed for the second part of the year are relatively far off and "fuzzy."

Based on the above information, training managers may assemble a tentative "slate of courses," run them by the advisory committee for comments and work from there to determine the necessary resources. That entails the number of instructors needed, number of multimedia courses and the number of times various courses will be given during the year.

Vinci said that in order to cost-justify start-up and other expenses in a stand up instructor-led environment (as opposed to multimedia), old courses should be taught at least twice a year and new ones three times yearly.

In the event a course or courses has to be given more times than is budgeted for, training departments should not "charge back" because other departments are likely to forego training if it is too burdensome for their budgets, he observed.

A resource planning guide is used to determine how much time will be spent on various training tasks. He recommended instructors teach 60 days yearly and one-half day of preparation time for each day of class taught. The latter figure may fluctuate widely, depending on the frequency of classes, he noted.

Fifteen days should be spent on development for each day of class taught, according to Vinci. That ratio is also susceptible to variance, depending on the complexity of the subject, he explained. Each instructor should receive 20 days of instruction per year in order to remain current.

Another 10% of instructors' time should be set aside for "spare capacity," including unexpected user demands for instruction. He stressed the importance of serving the needs of the organization.

Training Resources

Training resources cited by Vinci included facilities (rooms, office space and so on); materials and supplies (video courses and equipment, such as audio/visual); computer resources (hardware, software, terminals); courseware; publications and mailings; and outside education.

There is also a list of expenses to be considered, he pointed out. Among them are salary and benefits; materials and supplies; outside services; consulting services; computer services (public and in-house); travel and entertainment; training and development; space and utilities; and salaries of new hires.

Addressing himself to some of the most nettlesome problems presented by the budget process, Vinci said financial budgeting and training needs analysis are not usually done at the same time. The financial budget is usually done six to nine months in advance, meaning unexpected training requests put the training manager in the unenviable position of saying no or overspending his budget.

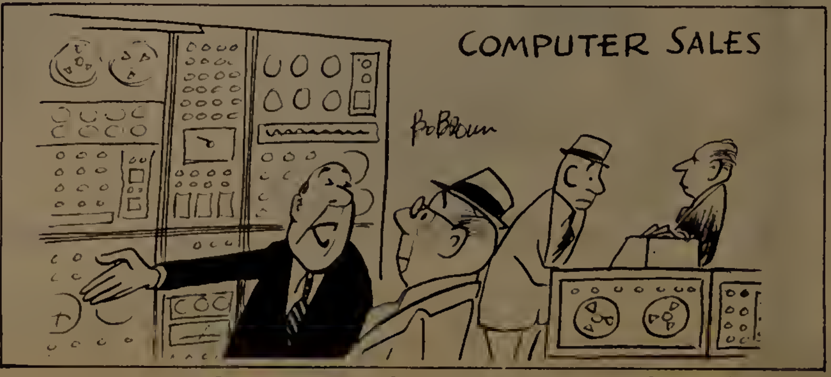
The training department is not supplied with timely information on the implementation of new technology, he claimed. Trainers may not know about new software until it is actually up and running. "Even information systems managers do not realize how long it takes to develop a course," he commented.

The unpredictable nature of computer charges can wreak havoc with training budgets. IBM has a tendency to come in and enhance software with supposedly transparent changes that increase computer charges, he maintained.

The evolving nature of computer-based instruction also makes its costs difficult to gauge, Vinci added.

He suggested going to management and asking them to grant some latitude for changing budgets during their development as a measure to alleviate the time disparities in financial and training budgets.

As for the implementation of new technology, it is wise to have trainers to be party to decision-making there, affording them the opportunity to know what is coming and learn something about it in advance. Vinci also advocated the formation of a "community of interest" in which members are kept abreast of major developmental milestones.



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Present Software Development Slammed

By Bruce Hoard
CW Staff

CHICAGO — Software development has made remarkably little progress since 1963, and current solutions to the problem are no more than Band-Aids.

That is the opinion of George Heidenrich, principal consultant for Input, Inc., a market research and consulting firm.

In 1963, 86% of DP personnel budgets was spent on software development and 14% on maintenance, Heidenrich said. Seventeen years later, in 1980, 46% was spent on development, 31% on maintenance and 23% for "enhancements." Heidenrich defined enhancements as voluntary changes taking more than a workweek to do, while maintenance is involuntary and takes less time.

"Did we know everything in 1963?" he asked. "Obviously not. We find people today doing things pretty much the same way they did in 1963." The consultant supported his argument with figures showing nearly identical curves representing time spent on analysis, coding, debugging, documentation and "other" in 1963 and again in 1980. What is worse, some DP managers are willing to spend up to 70% of their personnel budgets on maintenance, he claimed.

The same litany of problems is plaguing us now, he told attendees at the recent Deltak, Inc. international training conference here. Systems are late, over budget, unreliable and require constant enhancements. Systems people call users ignorant and demanding, while users accuse systems people of irresponsibility and arrogance. There is a general lack of coordination and understanding, he noted.

Current Solutions

Current solutions to this old crisis include interactive program development techniques such as code generators and screen painters, he commented, adding they are useful as far as they go — which is not very far in the overall scheme.

The same is true for design aids such as data bases and data dictionaries. However, the problem with data dictionaries is the expense involved in feeding existing systems into them.

And then there are cosmetic changes like separating maintenance from new development. "That's like painting a subway and hoping it runs on time," the consultant noted.

Although managers were quick to list solutions when queried, none suggested an idea that garnered more than 25% agreement among his peers. Seeking one cure-all or panacea is not the right approach anyway, according to Heidenrich.

Topping his list of problems were people problems. In interviews with DP professionals, Input found that the first five problem areas in order of magnitude involved people problems. He listed lack of personnel motivation, lack of management motivation and support, lack of personnel training and poor personnel recruitment and selection as examples.

Heidenrich proposed a sequence or pyramid of procedures to adapt in the quest for productivity. Starting at the bottom is quality, he said. Users must realize it is their system and understand the impact it will have on their business. Managers must look beyond technical problems and act as a bridge between the feuding user and system departments.

User involvement in project development is highly important, Heidenrich pointed out, because only the users understand the problems the system is being designed to eliminate. Users should be granted plenty of latitude to experiment and change things during the development process.

Along those lines, he noted the considerable cost savings that can be realized by finding errors in a system during its formatting stages. If errors are caught during definition, it does not cost anything to fix them, he said; costs go up as they are found during design. If errors are not found until the system is implemented, the entire system may have to be redesigned at prohibitive expense, he declared.

Scarcity of People

Making the personnel problem even worse is the relative scarcity of people, he said. The current 25% shortfall is "real" and can be expected to persist at least until 1985. There are currently a half million programmers and analysts and the demand is growing at 10% to 11% yearly.

Effective personnel is another step on Heidenrich's pyramid and proper people treatment is the way to achieve it. "The only way programmers can tell if they are doing a good job is if the boss isn't yelling at them," he said.

Tools are at the top of the pyramid, according to Heidenrich. "It's not important to have brand A or brand B," but it is important to have some brand, some version of the tool. The ones he listed included interactive development, organizational techniques (such as matrix management), a systems development methodology and structured walk-through.

"If you aren't doing structured walk-through, you just threw away the most valuable structured function," he claimed.

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Vector Graphic Tops Micro Heavyweights

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This year marks the second time that Datapro has contacted users from its own and Computerworld's *subscriber lists to find out how users employ the systems and what they think about their performance and promise.*

The 55-page report is available for $25 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

By **Tim Scannell**
CW Staff

DELRAN, N.J. — Vector Graphic, Inc. microcomputers came out on top in a recent Datapro Research Corp. survey of desktop and personal computers, beating out three of the industry's 8-bit heavyweights.

The California-based firm's machines scored better than those from Apple Computer, Inc., Commodore Business Machines, Inc. and Tandy Corp.'s Radio Shack in terms of user satisfaction. Vector Graphic's microcomputer-based systems also beat the IBM 5100 and Hewlett-Packard Co.'s 9800 systems, which were included in the multicategory survey.

On the other hand, Intertec Data Systems Inc.'s computers finished last in a field of at least 17 listed companies and their machines.

More than 330 microcomputer users took part in this year's survey, an 11% increase over last year's user base. However, while more users responded to Datapro's recent questions, last year's survey contained more than 10% more desktop and personal computer systems than the 492 represented in this year's study.

Besides winning the overall satisfaction trophy, the 17 Vector Graphic machines in the survey were also rated by their 11 owners as being easier to use than the three top microcomputer models, and more reliable in terms of the CPU and its related peripherals.

In addition, although all of the Vector Graphic users in the poll agreed that their systems fulfilled all presale expectations, only about 88% of the nearly 200 Apple, Commodore and Radio Shack computer users admitted that their systems did what was expected. The majority of the remaining numbers are undecided, the study showed.

Only one of the big three improved its ratings position over last year. Apple Computer — which was represented by 48 users and 77 systems — scored a 3.46 out of a possible 4.0 in overall satisfaction, jumping from fourth to third place. Last year, the company's computers scored a 3.3.

Commodore machines, which shared last year's fourth-place position with Apple, remained in fourth place. Only, this time the company shared its ratings slot and its 3.43 user satisfaction score with North Star Computers, Inc.

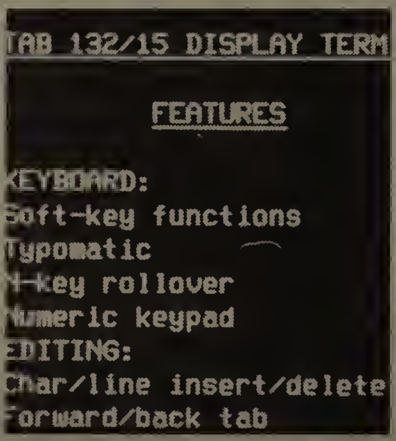
Radio Shack, which had the largest user base — 70 people — and the largest number of systems — 107 — in the survey, kept a firm grasp on last year's sixth-place position. Only, this time the firm and its TRS-80 machines were overcome by IBM and its 5100 computer. Last year, IBM was at the tail end of Datapro's ratings, holding last place. However, this year IBM leaped from eighth position to fifth place.

User Recommendations

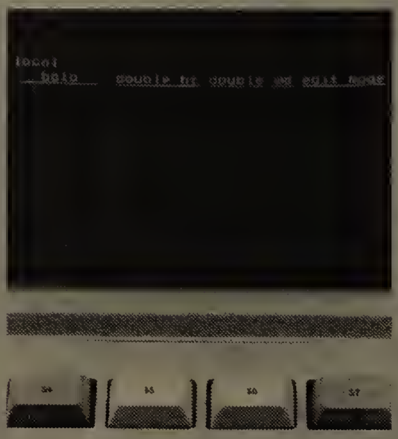
As in last year's survey, Datapro asked users if they would recommend their systems to another user. While the majority of nearly all the users polled responded they would, three out of the four Processor Technology Corp. computer owners in the survey said they would not — even though all of them reported that their systems did exactly what was expected.

In another part of the survey, Datapro asked users what problems they had with their systems, and if the vendor lived up to all delivery promises. By far the biggest complaints of nearly every user polled — especially the smaller ones — were that the installation of equipment was late and the vendor did not provide all of the promised software or support.

About 18% of the more than 100 Radio Shack users complained that delivery of software was late, while nearly 16% claimed the vendor did not live up to software and support promises. However, regardless of these software problems, approximately 40% of the present TRS-80 users indicated in the survey that they planned to acquire additional software from Radio Shack. A little more than 14% of the users reported they would seek another vendor for software supplies.



Non-glare, high resolution screen
(Unretouched photo)



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Users Rate Desktop, Personal Computers

Manufacturer and Model Survey Item	Alpha Micro (all models)	Altos (all models)	AM Jacquard J100/500	Apple (all models)	Commodore (all models)	Cromemco (all models)	Heath (all models)	Hewlett-Packard 9800	IBM 5100
No. of User Responses	15	10	4	48	7	8	4	4	30
No. of Systems Represented	20	12	7	77	12	14	4	4	41
Avg. Life of System (Mos.)	20.3	7.1	22.5	11.2	13.6	8.9	15.3	28.0	21.8
Acquisition Method (%)									
Purchase	86.67	80.00	50.00	100.00	100.00	87.50	100.00	100.00	93.33
Rental or Lease from Mfr.	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	3.33
Lease from 3rd Party	13.33	20.00	0.00	0.00	0.00	12.50	0.00	0.00	3.33
Principal Applications (%)									
Accounting/Billing	60.00	50.00	50.00	43.75	57.14	25.00	50.00	25.00	83.33
Banking-check processing/loans/savings	20.00	0.00	0.00	6.25	0.00	0.00	25.00	0.00	0.00
Construction/Architecture	0.00	0.00	0.00	4.17	0.00	0.00	0.00	0.00	3.33
Education-scheduling/administration	6.67	0.00	25.00	14.58	14.29	12.50	0.00	0.00	3.33
Engineering/Scientific	6.67	0.00	0.00	6.25	14.29	62.50	50.00	50.00	6.67
Health care/Medical	6.67	10.00	0.00	10.42	14.29	25.00	0.00	0.00	6.67
Insurance	0.00	0.00	0.00	4.17	0.00	0.00	0.00	0.00	10.00
Manufacturing	6.67	0.00	0.00	6.25	0.00	12.50	25.00	25.00	10.00
Mathematics/Statistics	13.33	0.00	0.00	29.17	0.00	25.00	25.00	25.00	10.00
Order Processing/Inventory Control	26.67	30.00	25.00	25.00	14.29	25.00	25.00	0.00	30.00
Payroll/Personnel	33.33	20.00	0.00	27.08	0.00	25.00	25.00	25.00	50.00
Petroleum/Fuel analysis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Process control	0.00	0.00	0.00	2.08	0.00	0.00	0.00	25.00	3.33
Purchasing	6.67	10.00	0.00	6.25	0.00	0.00	25.00	0.00	20.00
Sales Distribution	6.67	0.00	0.00	4.17	14.29	0.00	0.00	0.00	20.00
Other	40.00	70.00	75.00	43.75	42.86	25.00	25.00	75.00	23.33
Source of Applications Programs (%)									
In-house personnel	73.33	40.00	75.00	70.83	71.43	75.00	100.00	100.00	83.33
"Ready-made" programs from manufacturer	46.67	30.00	100.00	70.83	42.86	50.00	0.00	50.00	16.67
Contract Programming	26.67	30.00	0.00	8.33	0.00	25.00	0.00	0.00	23.33
Manufacturer's Personnel	6.67	0.00	25.00	2.08	0.00	0.00	0.00	0.00	6.67
Proprietary Software Packages	20.00	80.00	0.00	35.42	28.57	75.00	50.00	25.00	20.00
Location of Computer (%)									
Distributed Processing Site	13.33	30.00	25.00	24.44	16.67	25.00	0.00	25.00	6.90
Central Processing Installation	86.67	70.00	75.00	75.56	83.33	75.00	100.00	75.00	93.10
Using Local Workstations/Terminals (%)	100.00	50.00	100.00	68.75	71.43	100.00	100.00	75.00	46.66
Using Remote Workstations/Terminals (%)	26.67	10.00	25.00	2.08	14.29	50.00	0.00	25.00	3.33
Using Data Base Management System (%)	46.67	30.00	0.00	29.17	42.86	75.00	50.00	50.00	16.67
None	53.33	70.00	100.00	68.75	57.14	25.00	50.00	50.00	83.33
Manufacturer's Package	28.57	0.00	0.00	14.29	0.00	50.00	0.00	0.00	60.00
Outside Vendor's Package	42.86	66.67	0.00	57.14	66.67	33.33	0.00	50.00	20.00
Home-Grown System	28.57	33.33	0.00	28.57	33.33	16.67	100.00	50.00	20.00
Using Communications Monitor (%)	6.67	0.00	25.00	16.67	14.29	25.00	50.00	25.00	0.00
None	86.67	100.00	75.00	81.25	85.71	75.00	50.00	75.00	96.67
Manufacturer's Package	0.00	0.00	100.00	37.50	0.00	0.00	0.00	100.00	0.00
Outside Vendor's Package	100.00	0.00	0.00	62.50	0.00	0.00	50.00	0.00	0.00
Home-Grown System	0.00	0.00	0.00	0.00	100.00	100.00	50.00	0.00	0.00
Using Integrated Word Processing Functions (%)	80.00	60.00	100.00	45.83	71.43	75.00	50.00	50.00	43.33
Planned Acquisitions Implementations for 1981 (%)									
Additional Software from the Manufacturer	6.67	0.00	75.00	41.67	14.29	25.00	25.00	50.00	13.33
Proprietary Software from other suppliers	46.67	60.00	25.00	66.67	42.86	75.00	50.00	0.00	20.00
Expansions to Data Communications facilities	40.00	30.00	0.00	33.33	42.86	37.50	25.00	50.00	10.00
Distributed Processing capabilities	6.67	10.00	25.00	10.42	0.00	0.00	0.00	25.00	3.33
Expansions to present hardware	66.67	10.00	25.00	33.33	42.86	37.50	100.00	75.00	23.33
Another Computer System, same model	20.00	60.00	0.00	16.67	28.57	12.50	25.00	25.00	10.00
Integrated Word Processing capabilities	6.67	10.00	25.00	12.50	0.00	0.00	0.00	0.00	6.67
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	0.00	0.00	0.00	2.08	0.00	12.50	0.00	0.00	16.67
Yes, vendor unknown	0.00	0.00	25.00	4.17	0.00	0.00	25.00	0.00	3.33
Yes, different vendor	0.00	0.00	25.00	8.33	14.29	12.50	25.00	0.00	6.67
No	100.00	100.00	50.00	83.33	85.71	75.00	50.00	100.00	73.33

Alpha Micro (all models)	Altos (all models)	AM Jacquard (all models)	Apple (all models)	Commodore (all models)	Cromemco (all models)	Heath (all models)	Hewlett-Pack 9800	IBM 5100	Manufacturer and Model Survey Item
									Significant Advantages (%)
60.00	50.00	75.00	43.75	85.71	25.00	0.00	50.00	26.67	Users are happy with response time
86.67	50.00	50.00	70.83	42.86	62.50	0.00	50.00	10.00	System is easy to expand/reconfigure
26.67	40.00	25.00	43.75	42.86	12.50	100.00	0.00	6.67	System costs were less than expected
6.67	50.00	0.00	10.42	0.00	12.50	0.00	25.00	26.67	Programs/data carried over from other systems are compatible, as vendor promised
20.00	30.00	0.00	10.42	0.00	12.50	25.00	0.00	6.67	Terminals/peripherals carried over from other systems are compatible, as vendor promised
46.67	60.00	25.00	33.33	14.29	0.00	50.00	75.00	26.67	System is power/energy efficient
13.33	0.00	0.00	20.83	14.29	0.00	50.00	25.00	33.33	Productivity aids help us keep programming costs down
20.00	10.00	0.00	12.50	14.29	12.50	25.00	0.00	23.33	Data base language is efficient and effective
6.67	10.00	25.00	25.00	0.00	0.00	25.00	0.00	20.00	Delivery and/or installation of equipment was ahead of schedule
0.00	10.00	25.00	12.50	0.00	0.00	25.00	0.00	3.33	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	25.00	2.08	0.00	0.00	0.00	0.00	6.67	Computer proposed by vendor was too small
6.67	0.00	25.00	6.25	0.00	0.00	0.00	25.00	0.00	Installation of equipment was late
20.00	10.00	25.00	8.33	0.00	12.50	0.00	0.00	3.33	Delivery of required software was late
0.00	0.00	25.00	6.25	0.00	0.00	0.00	25.00	3.33	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
26.67	10.00	25.00	6.25	0.00	50.00	0.00	0.00	3.33	Vendor did not provide all the promised software or support
6.67	0.00	0.00	2.08	0.00	50.00	0.00	0.00	3.33	Program/data compatibility not what vendor promised
0.00	10.00	0.00	2.08	14.29	12.50	0.00	0.00	0.00	Terminals/peripherals compatibility not what vendor promised
6.67	0.00	25.00	4.17	0.00	0.00	0.00	25.00	0.00	Vendor enhancements/changes to hardware/software hard to keep up with
13.33	0.00	0.00	0.00	14.29	0.00	25.00	0.00	0.00	Equipment is excessively noisy
0.00	0.00	0.00	2.08	0.00	12.50	0.00	0.00	0.00	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.57	3.70	3.75	3.50	3.43	3.43	2.75	3.50	3.73	Ease of operation
3.67	3.70	3.75	3.70	3.33	3.00	4.00	4.00	3.67	Reliability of Mainframe
3.40	3.20	3.25	3.32	3.17	3.00	3.50	3.25	3.54	Reliability of Peripherals
									Maintenance service:
2.67	2.60	2.50	2.89	2.33	2.00	2.50	3.00	3.79	Responsiveness
2.42	2.40	2.50	3.14	2.33	2.00	2.50	3.33	3.52	Effectiveness
									Technical support:
2.42	2.57	2.50	3.03	2.00	2.38	2.25	2.00	3.24	Trouble-shooting
2.25	2.25	1.75	2.78	2.33	2.43	2.00	2.00	3.23	Education
2.43	2.11	2.00	3.09	1.50	2.86	2.75	1.33	2.93	Documentation
									Manufacturer's software:
3.38	3.29	3.50	3.11	3.00	3.25	3.00	3.50	3.43	Operating system
3.38	3.14	3.00	3.08	2.67	3.00	2.67	—	3.25	Compilers & Assemblers
2.58	3.33	2.75	3.16	2.33	2.86	1.67	3.00	2.50	Applications Programs
3.50	3.11	3.50	3.31	3.00	2.88	3.00	3.25	3.59	Ease of programming
3.00	3.40	3.00	3.13	2.50	3.00	2.33	2.67	3.00	Ease of conversion
3.50	3.20	3.25	3.46	3.43	2.88	2.75	3.25	3.38	Overall satisfaction
									Did the system do what you expected it to do? (%)
86.67	100.00	75.00	87.50	85.71	75.00	100.00	100.00	86.67	Yes
6.67	0.00	25.00	2.08	0.00	12.50	0.00	0.00	6.67	No
6.67	0.00	0.00	8.33	14.29	12.50	0.00	0.00	3.33	Haven't decided
									Would you recommend system to another user? (%)
86.67	100.00	75.00	93.62	100.00	87.50	75.00	100,00	89.66	Yes
13.33	0.00	25.00	2.13	0.00	12.50	25.00	0.00	6.90	No
0.00	0.00	0.00	4.26	0.00	0.00	0.00	0.00	3.45	Haven't decided

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Users Rate Desktop, Personal Computers

Manufacturer and Model Survey Item	IMSAI (all models)	Intertec (all models)	North Star Horizon	Ohio Scientific (all models)	Pertec (all models)	Processor Technc (all models)	Radio Shack (all models)	Vector Graphic (all models)	Other Personnel Computers
No of User Responses	7	6	14	9	9	4	70	11	77
No of Systems Represented	10	7	26	9	10	6	107	17	109
Avg Life of System (Mos)	42.7	6.5	23.2	18.6	9.7	33.0	12.5	18.7	42.55
Acquisition Method (%)									
Purchase	100.00	100.00	100.00	88.89	66.67	50.00	97.14	90.91	88.16
Rental or Lease from Mfr	0.00	0.00	0.00	11.11	11.11	0.00	2.86	0.00	3.95
Lease from 3rd Party	0.00	0.00	0.00	0.00	22.22	50.00	0.00	9.09	7.89
Principal Applications (%)									
Accounting/Billing	71.43	83.33	57.14	66.67	66.67	0.00	55.71	63.64	74.02
Banking-check processing/loans/savings	14.29	0.00	0.00	0.00	0.00	0.00	1.43	0.00	3.90
Construction/Architecture	0.00	16.67	7.14	0.00	0.00	0.00	2.86	0.00	2.60
Education-scheduling/administration	0.00	0.00	0.00	11.11	22.22	0.00	11.43	9.09	6.49
Engineering Scientific	14.29	16.67	28.57	11.11	0.00	0.00	7.14	18.18	11.69
Health care/Medical	0.00	16.67	0.00	0.00	22.22	0.00	5.71	0.00	6.49
Insurance	0.00	0.00	0.00	0.00	11.11	0.00	4.29	0.00	6.49
Manufacturing	28.57	0.00	7.14	0.00	11.11	0.00	5.71	0.00	14.29
Mathematics/Statistics	42.86	16.67	14.29	11.11	0.00	0.00	14.29	36.36	14.29
Order Processing/Inventory Control	57.14	33.33	28.57	11.11	33.33	25.00	21.43	27.27	38.96
Payroll/Personnel	14.29	66.67	21.43	44.44	33.33	25.00	30.00	27.27	48.05
Petroleum/Fuel analysis	14.29	0.00	0.00	0.00	0.00	0.00	1.43	0.00	1.30
Process control	0.00	0.00	0.00	11.11	11.11	0.00	1.43	0.00	7.79
Purchasing	14.29	0.00	0.00	0.00	22.22	0.00	8.57	0.00	16.88
Sales Distribution	14.29	33.33	21.43	11.11	33.33	0.00	17.14	9.09	20.78
Other	14.29	33.33	50.00	44.44	33.33	75.00	60.00	45.45	41.56
Source of Applications Programs (%)									
In-house personnel	100.00	83.33	64.29	77.78	66.67	25.00	71.43	81.82	68.83
"Ready-made" programs from manufacturer	0.00	50.00	42.86	44.44	44.44	25.00	54.29	72.73	41.56
Contract Programming	0.00	33.33	14.29	22.22	44.44	25.00	17.14	0.00	12.99
Manufacturer's Personnel	14.29	0.00	0.00	0.00	11.11	0.00	0.00	9.09	7.79
Proprietary Software Packages	14.29	33.33	50.00	33.33	22.22	25.00	37.14	36.36	28.57
Location of Computer (%)									
Distributed Processing Site	14.29	33.33	7.14	0.00	12.50	25.00	20.00	27.27	15.79
Central Processing Installation	85.71	66.67	92.86	100.00	87.50	25.00	80.00	72.73	84.21
Using Local Workstations/Terminals (%)	85.71	16.67	100.00	100.00	77.77	50.00	61.43	90.91	87.01
Using Remote Workstations/Terminals (%)	0.00	16.67	21.43	0.00	11.11	0.00	18.57	9.09	27.27
Using Data Base Management System (%)	14.29	0.00	35.71	66.67	11.11	25.00	34.29	36.36	31.17
None	85.71	100.00	64.29	33.33	88.89	75.00	65.71	63.64	64.94
Manufacturer's Package	0.00	0.00	0.00	66.67	0.00	0.00	29.17	0.00	29.17
Outside Vendor's Package	100.00	0.00	40.00	16.67	0.00	100.00	41.67	50.00	41.67
Home-Grown System	0.00	0.00	60.00	16.67	100.00	0.00	29.17	50.00	29.17
Using Communications Monitor (%)	0.00	0.00	7.14	0.00	11.11	25.00	22.86	27.27	24.68
None	100.00	100.00	92.86	100.00	77.78	50.00	74.29	72.73	71.43
Manufacturer's Package	0.00	0.00	0.00	0.00	100.00	0.00	18.75	33.33	33.33
Outside Vendor's Package	0.00	0.00	0.00	0.00	0.00	100.00	50.00	33.33	44.44
Home-Grown System	0.00	0.00	100.00	0.00	0.00	0.00	31.25	33.33	22.22
Using Integrated Word Processing Functions (%)	28.57	83.33	85.71	55.56	33.33	75.00	68.12	90.91	55.41
Planned Acquisitions Implementations for 1981 (%)									
Additional Software from the Manufacturer	0.00	16.67	35.71	0.00	33.33	25.00	40.00	18.18	23.38
Proprietary Software from other suppliers	71.43	33.33	71.43	44.44	44.44	75.00	14.29	54.55	40.26
Expansions to Data Communications facilities	14.29	33.33	42.86	0.00	44.44	0.00	34.29	36.36	16.88
Distributed Processing capabilities	0.00	16.67	14.29	0.00	11.11	0.00	11.43	9.09	11.69
Expansions to present hardware	42.86	66.67	64.29	22.22	22.22	25.00	45.71	27.27	40.26
Another Computer System, same model	0.00	0.00	21.43	0.00	0.00	0.00	14.29	9.09	15.58
Integrated Word Processing capabilities	0.00	16.67	21.43	11.11	11.11	0.00	2.86	9.09	10.39
Plans for system replacement in 1981 (%)									
Yes, same manufacturer	0.00	0.00	0.00	0.00	0.00	0.00	2.86	9.09	9.09
Yes, vendor unknown	28.57	16.67	7.14	0.00	0.00	0.00	5.71	0.00	1.30
Yes, different vendor	14.29	16.67	0.00	33.33	11.11	25.00	4.29	0.00	10.39
No	57.14	66.67	92.86	66.67	88.89	75.00	87.14	90.91	77.92

IMSAI (all models)	Intertec (all models)	North Star Horizon	Ohio Scientific (all models)	Pertec (all models)	Processor Technol (all models)	Radio Shack (all models)	Vector Graphic (all models)	Other Personnel Computers	Manufacturer and Model Survey Item
									Significant Advantages (%)
28.57	33.33	57.14	33.33	11.11	25.00	42.86	45.45	42.86	Users are happy with response time
42.86	33.33	71.43	22.22	33.33	25.00	61.43	81.82	50.65	System is easy to expand/reconfigure
28.57	50.00	35.71	11.11	11.11	25.00	35.71	36.36	27.27	System costs were less than expected
14.29	33.33	21.43	0.00	22.22	25.00	5.71	36.36	25.97	Programs/data carried over from other systems are compatible, as vendor promised
28.57	16.67	21.43	11.11	0.00	50.00	4.29	27.27	24.68	Terminals/peripherals carried over from other systems are compatible, as vendor promised
28.57	16.67	42.86	11.11	33.33	25.00	34.29	45.45	28.57	System is power/energy efficient
0.00	33.33	14.29	0.00	11.11	0.00	14.29	18.18	15.58	Productivity aids help us keep programming costs down
0.00	0.00	7.14	33.33	0.00	0.00	10.00	9.09	11.69	Data base language is efficient and effective
0.00	0.00	7.14	11.11	11.11	0.00	11.43	27.27	15.58	Delivery and/or installation of equipment was ahead of schedule
0.00	0.00	0.00	0.00	0.00	0.00	7.14	27.27	5.19	Delivery of required software was ahead of schedule
									Significant Problems (%)
0.00	0.00	7.14	0.00	33.33	0.00	2.86	0.00	7.79	Computer proposed by vendor was too small
0.00	33.33	14.29	22.22	33.33	0.00	7.14	9.09	10.39	Installation of equipment was late
0.00	33.33	14.29	0.00	22.22	25.00	18.57	9.09	16.88	Delivery of required software was late
14.29	0.00	7.14	11.11	11.11	0.00	7.14	9.09	10.39	System costs (for hardware, vendor-supplied software, support) exceeded the expected total
28.57	50.00	28.57	44.44	33.33	50.00	15.71	0.00	22.08	Vendor did not provide all the promised software or support
0.00	0.00	0.00	22.22	11.11	0.00	4.29	0.00	6.49	Program/data compatibility not what vendor promised
0.00	16.67	0.00	0.00	0.00	0.00	1.43	9.09	6.49	Terminals/peripherals compatibility not what vendor promised
0.00	0.00	14.29	44.44	11.11	0.00	8.57	18.18	7.79	Vendor enhancements/changes to hardware/software hard to keep up with
0.00	0.00	0.00	33.33	11.11	0.00	4.29	0.00	15.58	Equipment is excessively noisy
0.00	0.00	0.00	11.11	0.00	0.00	1.43	0.00	2.60	Power and/or cooling requirements are excessive
									System Ratings (4.0-0.0)
3.29	2.83	3.57	3.22	3.44	3.25	3.47	3.82	3.39	Ease of operation
3.00	2.50	3.43	2.89	3.44	3.25	3.26	3.73	3.37	Reliability of Mainframe
3.00	2.50	3.31	3.25	3.33	3.25	2.91	3.55	3.15	Reliability of Peripherals
									Maintenance service:
1.57	1.67	2.62	2.43	3.22	2.50	2.72	3.38	2.85	Responsiveness
1.86	1.67	2.85	2.14	3.22	2.50	2.84	3.50	2.71	Effectiveness
									Technical support
1.86	1.67	2.42	1.86	3.11	2.75	2.32	3.00	2.36	Trouble-shooting
1.86	1.67	2.42	2.13	2.75	2.33	2.39	2.80	2.11	Education
2.43	1.83	2.77	1.67	2.22	2.33	2.56	3.27	2.04	Documentation
									Manufacturer's software:
2.40	2.67	3.21	2.89	3.11	3.00	2.75	3.36	3.21	Operating system
2.20	2.60	3.18	2.63	2.80	3.00	2.65	3.55	3.00	Compilers & Assemblers
2.25	2.60	2.29	1.88	2.14	—	2.33	3.71	2.56	Applications Programs
2.67	2.83	3.29	2.67	3.11	3.50	3.36	3.55	3.12	Ease of programming
2.33	2.50	2.91	2.33	2.83	3.33	2.97	3.57	2.78	Ease of conversion
2.67	2.17	3.43	2.56	3.00	3.25	3.21	3.64	3.00	Overall satisfaction
									Did the system do what you expected it to do? (%)
85.71	83.33	92.86	77.78	55.56	100.00	92.86	100.00	80.52	Yes
14.29	0.00	0.00	22.22	11.11	0.00	4.29	0.00	9.09	No
0.00	16.67	7.14	0.00	33.33	0.00	2.86	0,00	10.39	Haven't decided
									Would you recommend system to another user? (%)
71.43	33.33	78.57	66.67	55.56	25.00	87.14	90.91	64.47	Yes
14.29	33.33	7.14	22.22	11.11	75.00	4.29	9.09	23.68	No
14.29	33.33	14.29	11.11	33.33	0.00	7.14	0.00	11.84	Haven't decided

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Acceptance of Computers Urged

New World of Corporate DP Auditors Sighted

By Bob Johnson
CW New York Bureau

NEW YORK — A brave new world of DP professional is emerging from the corporate world — the DP auditor.

That was the consensus of opinion among speakers and attendees at the first Information Systems Control Conference held here recently. The five-day conference, sponsored by the Institute of Internal Auditors (IIA), focused on the need for professional auditors to educate themselves about data processing which, conference officials said, is becoming an integral part of the auditing function.

> *'Because auditing in the past was primarily a manual procedure, the acceptance of the computer and internal control software has not come easily to "green visor" auditors.'*

Because auditing in the past was primarily a manual procedure, the acceptance of the computer and internal control software has not come easily to "green visor" auditors. This resistance, coupled with the feeling among DPers that auditors represent a threat, has often produced bad feelings, officials said. These feelings are compounded because auditors are sometimes reluctant to ask important systems questions, but "the brave ones are learning the new technology.

"An adversary type of effort resulted in a lot of companies because of these confrontations between DP people and auditing staffs," noted Lee Haynes, conference chairman. He referred to a study of internal controls in U.S. corporations conducted by the Graduate School of Business Administration at the University of Michigan which showed the extent of the conflict between these two groups.

Auditing department managers now realize that their auditors need DP training if they are to perform their jobs efficiently, Haynes said. The extent of that training should depend upon the level of auditing personnel in the corporation.

The first level includes the general auditor. He should have some knowledge of the DP function and how it might help in managing corporate resources, Haynes said.

The second level includes the auditing director or manager. This person should have more systems knowledge than he does now, Haynes indicated.

The DP auditor is the third level. This person is chiefly responsible for auditing information systems. Haynes' big concern here is that many times an auditor audits "around the computer" by asking people what's going on rather than by testing the system.

"The DP auditor must get away from that type of procedure so he can become more independent of the data processing department," Haynes said. "He must be taught how to use the computer as a tool to control audits."

Audit Specialist

The fourth level includes the DP audit specialist. This person needs a knowledge of systems programming. "To do an in-depth evaluation of the DPO function, the auditor at this level should really know software and hardware," Haynes said.

Haynes also suggested that the auditor be involved immediately after the general design of a system to make sure that proper controls are installed.

In the U.S., which has some 100,000 corporate auditors in the private sector, only about five out of 50 are DP auditors, according to IIA figures. This lack of DP experience is a major concern of the association, and this first conference is an expression of that concern.

John Fletcher, executive director of professional development for IIA, said the DP auditor "must invest in himself so as to learn the new technological techniques and be able to select the critical information needed in an organization.

"Manual auditors" may be victims of what he called the "Paul Principle," a stage in an auditor's professional development where he reaches a competent level, but fails to keep abreast of new technology. "We need one auditor — a combination of the manual and DP auditor who knows what kind of information is essential," Fletcher said.

Seeking to improve the working relationship between auditors and DPers, IIA has scheduled four-week seminars to train auditors in DP technology. These seminars are scheduled for this year and next and will be held around the world, IIA said.

QED to Offer Nine Courses

WELLESLEY, Mass. — QED Information Sciences, Inc. has announced it is offering a variety of courses to the DP community throughout the year in six major cities including Boston, New York, Dallas/Fort Worth, Philadelphia, Raleigh, N.C., and Teaneck, N.J.

The nine selections in the Systems Development program will encompass analysis and design workshops and DP quality assurance. Two- to five-day courses on data bases, data communications, distributed processing and management will also be conducted throughout April, May and June, the spokesman for the firm said.

Tuition for these programs ranges from $295 to $695, with discount membership plans available. All QED courses are reportedly offered on an in-house basis as well. Full schedules and details can be obtained from QED through P.O. Box 181, QED Plaza, Wellesley, Mass. 02181.

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More Harassment Than Glamour

Soul Searching Urged for Would-Be Witnesses

By Marcia Blumenthal
CW Staff

CHICAGO — Before agreeing to serve as an expert witness in a court case, computer professionals should do plenty of soul searching because the experience is more often harassing than glamorous.

That was the advice given to would-be witnesses by a panel of lawyers and professionals familiar with courtroom appearances during a National Computer Conference session here recently.

Legal cases have a habit of droning on, insidiously eating away at a professional's time, advised Susan Nycum, a noted computer attorney based in Palo Alto, Calif., with the firm of Gaston Snow and Ely Bartlett. "Do you have the time to go through mounds of paper in a timely fashion?" she asked.

Inclination is another attitude computer professsionals should examine before agreeing to serve as expert witnesses. Those contemplating offering their services as witnesses should sit through a trial at a federal court house, Nycum suggested. Be prepared for a cathedral-like atmosphere where the judge sits above everyone else.

"You may be skilled at the politics at a corporation or a university," she continued, "but you may not be able to maneuver well in the legal environment." Lawyers have verbal, rather than quantitative, skills, she warned, adding that communicating with lawyers can prove difficult for some computer professionals.

Certain of Skills

But more than the environment of the courtroom, Nycum stressed computer professionals who become expert witnesses must be absolutely certain of their skills, making sure not to take on a project that is beyond the scope of their expertise.

"Lawyers will attempt to discredit your expertise at every opportunity, so be sure you are able to withstand confrontation," she stressed.

The role of an expert is twofold — a consultant and a witness at trial — explained Robert L. Graham, an attorney with Jenner & Block here. If computer professionals wish to serve as consultants only, their primary duty is to educate the attorney, Graham noted. In this capacity, professionals help the attorney formulate questions and answers to probable questions the opposing side will raise.

As consultants, professionals are not subject to discovery proceedings, unless they decide to continue as expert witnesses.

In any case, computer professionals must be able to present their points cogently, using a minimal amount of jargon.

Once on the stand as expert witnesses, computer professionals must be able to consistently repeat what they have said in pretrial discovery proceedings. If professionals fail to do this, their testimony will be decimated, usually in a highly embarrassing fashion, the attorneys noted.

Speaking as an experienced witness, Herbert S. Bright, president of Computation Planning, Inc. of Washington, D.C., observed professionals are looking for ways to reach specific truths, but lawyers are not in court to seek the truth, but to win the case. "A lot of witnesses are shocked by the fact that the truth is not enough. They are surprised when an attorney tries to limit the scope of their answers."

If there is one place witnesses have to be "fetishists" is assuring what they say is defensible as true. "If the opposing attorney detects the slightest softness in your response or demeanor, he will tear you to shreds on the stand."

The best way to cover a response is to preface answers with the remark "to the best of my knowledge I believe this to be true", Bright suggested.

International Harvester Offers Turnkey Systems

CHICAGO — International Harvester Co. (IH), an agricultural machinery manufacturer headquartered here with 3,700 dealers and distributors nationwide, has announced the availability of its own computer systems for dealership record control and correspondence.

The Dealer Support Services division of IH's Information Systems Services Department developed a microcomputer-based system custom designed for its own dealers called the IH System I, according to Tom Dunne, an IH spokesman.

The company switched from a Texas Instruments, Inc. TI 742 to a system built around an Industrial Micro Systems, Inc. 64K-byte microcomputer that uses CRT terminals for data entry.

The system brings together "the best of the latest technological developments," according to Dunne who calls it an "off-the-shelf turnkey system." Besides the IMS microcomputer, the IH System I uses a Televideo, Inc. CRT terminal and Centronics Data Computer Corp. printer.

Designed with the entry-level, small dealer in mind, the system can be used for control accounting, payroll, parts inventory, point-of-sale invoicing, leasing and sales agreements, orders and intracompany communications, according to Dunne.

All the dealer's transactions and daily business are batch processed at the company's computer center here. The system is interruptible for on-line information regarding parts availability, according to Dunne.

The System I is upward compatible, according to the vendor, who said the System II, which will be introduced early next year, adds up to three CRT terminals or more without changing the programs and has 5M bytes of hard disk storage.

The first System I will be installed in May.

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DP Seen Critical to Manufacturing Productivity

By Robert Batt
CW West Coast Bureau

CHICAGO — Finding the "Keys to Productivity" — the theme of the 1981 National Computer Conference held here recently — will depend to a great extent on the widespread infiltration of traditional data processing into manufacturing, according to Russell Melton, director of special systems production at Inland Steel Co.

A whole range of new issues would have to be tackled as technology was applied more and more in the fields of process control and assembly. "In the future, we need to make possible much more integration of process control computers with data processing than we have ever done before in order to improve productivity. This means we need to tackle issues such as standardization on things such as protocols where standards differ between process control computers and DP computers," he said.

With the urgent need to improve productivity throughout American industry, there is suddenly an acceptance in the manufacturing industry of things formerly shunned. "Companies are willing to do things they were not willing to do before, for example using computer applications in spare parts and maintenance planning," he said. "In the case of maintenance planning, while the DP professionals have wanted to do it for a long time, there was a lot of resistance from mechanics and electricians. However, the emphasis on profit margins and productivity has changed a lot of minds."

Melton warned that, so far, this type of application has proved extremely difficult to bring off successfully; nobody has yet gotten a handle on what kind of productivity increase could be expected by keeping machines up and running. He added, "By doing a better job of implementing computerized planning maintenance systems, perhaps we could increase productivity by up to 10%. As spare parts control and other systems progress, this could be a big best seller in the 1980s."

Melton also referred to the Japanese practice of carrying as little inventory as possible in manufacturing plants, thereby reducing the cost of stock. U.S. firms, he said, are also beginning to follow this practice and use computers to keep a running check on stock and to set up systems that enable suppliers to deal quickly with quick demands for material.

Such developments, he argued, would give added credence to the notion of information interchange between companies, and in future years this could easily become a standard way of doing business.

Business Scene

At the same session — "The DP Production Process in the '80s" — Carl Thomson of Satellite Business Systems in McLean, Va., scorned arguments that teleconferencing would not become part of the U.S. business scene because of social customs.

"With the cost of travel going up at an annual compound rate of 40% a year, many organizations are going to have to face the facts and decide whether it is worth spending money on sending an executive to distant parts of the globe for two days in order to have a one-hour meeting," Thomson said.

Because of slow productivity in the U.S., information processing will continue to grow by leaps and bounds as organizations seek to improve performance. At current rates information technology could climb to around 25% of the gross national product, he said.

Thomson argued that, while the use of electronic facilities such as teleconferencing would initially be used to solve problems — such as the cost of travel — as time went on the technology would be regarded not so much as a cost control measure, but more as a business opportunity.

In this connection, he said, satellites represent a revolution similar to the DP revolution of the last 90 years. With deregulation, the communications industry will be shaken up as costs are driven down.

"The real opportunities come from not looking at this new technology discretely, but in an integrated network. Developments will result in lower communications costs, a reduction in communications restraints with the ability to site computers where you want them, improved company communications and an increase in personnel productivity and organization responsiveness, he concluded".

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'Graphics Mafia' Sketches Possibilities

Widespread Graphics Use Seen on Horizon

By Robert Batt
CW West Coast Bureau

CHICAGO — There is an old adage about the computer graphics industry that its widespread application is only a year away and that before long, raster-scan displays and image processing will have entered the everyday parlance of data processing professionals.

As if to emphasize their belief that the use of computers is becoming much more widespread in the creation and control of images, graphics experts from across the nation gathered in force here recently to discuss "Imaging and Computers" at the National Computer Conference. The session featured heavyweight representatives from what has become known as the "graphics Mafia," with experts from the world of graphics languages and the nuclear reactor industry as well as the usual assortment of consultants and academics.

Nola Donato of Wizard Software here kicked off the proceedings with a description of Grass 3, a language designed for interactive graphics. With the advance of technology, she said, graphics devices are becoming more powerful and less expensive, making interactive graphics increasingly popular as a method of man-machine communication. Interactive graphics require a high level of feedback both with the user and with the hardware; for these reasons, conventional programming languages are not well suited for such applications.

Serious Drawback

"One of the most serious drawbacks of conventional programming languages in the graphics environment is the difficulty of tailoring them to a particular device. In most of the higher level languages, subroutines are the only feasible way to add new features. Consequently, it is almost impossible to achieve the communication between hardware and software needed to support a real-time application," she said.

Grass 3 was designed to interface easily with specialized hardware and software. Depending on what devices it must talk to, Grass 3 might require a set of special commands, device-dependent variables or even new data types. The language is intended to make internal rearrangements simple and straightforward.

Also speaking at the session was Joel N. Orr of Orr Associates, Inc. in Danbury, Conn., who thinks Grass 3 would give people something to work with. But he warned that progress would not be easy.

"As in other areas of computer technology, graphics has been grossly oversold. As a result, it lost a lot of credibility in its early days and is only now climbing slowly back into a position of visibility — which is where it should be," he said.

Orr contended that as far as the user is concerned, computer graphics is about as significant as alloys are to a piston ring. While they are both important and necessary to carry out certain functions, the user does not care how the job gets done so long as it is done.

Addressing the general NCC theme of productivity, David Friend, chairman of Computer Pictures Corp. of Boston, said the need to carry out operations more productively is the driving force behind the recent surge in graphics applications.

"We are going to see exponential growth in the computer graphics industry over the next few years," he predicted.

Enormous Savings

According to Friend, enormous savings can be reaped from the use of graphics in areas such as computer-aided design and manufacturing (CAD/CAM), business graphics and animation. "Such savings will be as powerful a driving force as they were in the early years of the computing industry itself," he added.

Friend said the real question facing the industry is how to take numbers and turn them into pictures, since no one really doubts the efficacy of presenting information in graphic as opposed to tabulated form. To the extent that vendors can efficiently use the hardware and software available to turn numbers into pictures, so the graphics industry will continue to grow.

Friend cited the latest figures from government sources, which show that 1,000 pages of information per year is circulating in the U.S. for every man, woman and child, an increase of 25% over 1979.

"This amount of paperwork is getting to be a bigger and bigger burden for businessmen. They do not want to have to wade through 60 pages of notes in order to discover what is going on in sales, for example, and so they are looking to graphics to reverse the trend of the last 20 years in which they have become inundated with paper," he said.

Friend predicted that as graphics systems became more user-friendly and therefore more useful to the consumer, so business graphics will accelerate in growth to head the field, even outstripping increases in areas such as CAD/CAM.

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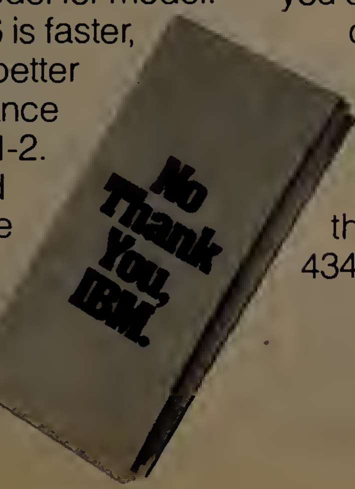

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Ethernet Topology Swung DEC's Choice for Local Net

By Bruce Hoard
CW Staff

CHICAGO — Digital Equipment Corp. selected Ethernet as the basis for its local-area network architecture offerings because it utilizes contention arbitration topology, David Potter, DEC's engineering manager of network hardware, told attendees at the National Computer Conference here recently.

The alternatives included "having 300 users on 299 lines" and linear, or bus, topology. The linear model is based on a master-slave protocol. It was dismissed because the location of the master is not always clear, Potter said.

He led up to his discussion of contention arbitration by describing the needs of local-area network users and explaining that Ethernet takes care of the bottom two layers of network communications.

Calling Ethernet "a good strong foundation on which to build your local network," Potter said it connects intelligent nodes together through a single coaxial cable running throughout buildings.

The architecture uses serial data transmission and is packet-oriented, meaning the entire message is sent at once, he said. Parallel connections to the system should be made "fairly close" to the node and not "300 feet down the hall."

Contention arbitration is the process by which message senders access the network and pass their data, Potter explained. When one user is transmitting, other stations must "listen" and wait for the channel to clear.

If, however, two users choose to send packets at the same time and the messages collide, the system truncates the original messages and dispenses them to the conflicting nodes to explain the collision.

The sender then waits a random period of time and attempts to retransmit. Potter likened the situation to that of Laurel and Hardy trying to push themselves through a door at the same time, but with a slight variation. "Ethernet backs off a random distance into the room and then throws itself at the door," he observed.

Method to Madness

Even though it sounds haphazard, there is method to Ethernet's particular madness, Potter went on. For instance, if a channel with 200 users is 40% utilized, there is a 90% chance each packet will be transmitted with fewer than two collisions.

The engineering manager listed 32-bit CRC, which guarantees no undetected coding errors and 50-ohm coaxial cable as two features Ethernet offers. The 50-ohm cable holds down reflection, he explained.

DEC also wanted a 10M-bit transmission rate and up to 128 devices per cable segment. That number was subsequently reduced to 100.

The network allows 500-meter lengths per cable segment and up to 2,500 meters between any two devices. It may utilize 3,500-meter coaxial cable segments connected by repeaters, he added.

Phil Arst, program manager for Intel Corp.'s Ethernet effort, described the very large-scale integration (VLSI) design considerations for the Ethernet protocol. Intel was looking for stability, or a proven protocol, and simplicity, or the ability to reduce a complex protocol to silicon, he said.

The company wanted to keep the complexity of its controller equal to or no greater than its 8086 chip, and the design time to no more than three years, Arst explained, and users should not have to do programming at the data link level.

Ethernet provided all those needs with low cost, high functionality, minimum CPU intervention, flexible implementation and low pin count, a feature that would lead to lower costs, he said.

The goal of a single component evolved into two components, he noted: a VLSI controller for the complexity of protocols and a line driver component to handle bit decoding, serialization and deserialization.

Arst also told his audience it must get started on the development of high-level communications software so that when the appropriate hardware is available, users will be able to effect a "speedy full-system integration."

Ungermann-Bass to Supply Ethernet Interfaces to Xerox

SANTA CLARA, Calif. — Ungermann-Bass, Inc. here will supply Xerox Corp. with its recently announced Ethernet-compatible network interface units, according to an agreement the two companies announced recently.

A codeveloper of the Ethernet architecture for local-area data networks, Xerox now plans to market the Ungermann-Bass interface units as Model 872 and 873 communications servers. Shipments will begin in fourth quarter 1981, a spokesman said.

Xerox announced last November it would offer the two interface units as part of its Xerox 8000 network system for Ethernet.

The Xerox 872 and 873 units, respectively, will provide four and eight user interface ports, allowing the non-Xerox units — such as terminals and host CPUs — to exchange information with Ethernet devices, the spokesman explained. And the units will enable exchanges of data among Xerox 860 information processing systems and other 8000 series products.

The units support IBM's asynchronous, 2770, 2780 and 3780 communications protocols and will eventually support the 3270 bisynchronous and Synchronous Data Link Control protocols.

Earlier this year, Ungermann-Bass introduced an Ethernet-compatible version of its Net/One local network system [CW, May 4]. Net/One deliveries are to begin in July.

Northeastern Designs Program For Women in Computer Science

BOSTON — A computer science and engineering program designed specifically for women who have bachelor's degrees in mathematics, physics or a natural science, but want master's qualifications in computer science and engineering, has been introduced by Northeastern University here.

Thomas J. Kerr, acting director of graduate engineering, said he expected teachers who have lost their jobs because of the Boston school system's financial difficulties to be attracted to the program, as well as women who left the work force to raise a family.

The program features a series of transitional courses designed to bring women of diverse academic backgrounds up to the level required for an entering graduate student in engineering. Courses and academic advising are coordinated with visits to local and electronics industries, Kerr said.

Financial Support

Financial support for students is available in the form of scholarships and fellowships for full-time students or cooperative programs and employee remission schemes for part-time students.

Funding for the graduate program was provided by the Bay State Skills Commission.

More information is available from Northeastern University, Office of Public Information, Room 06 Robinson Hall, 360 Huntington Ave., Boston, Mass. 02115.

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Seeking to Balance Benefits, Risks

Life-Cycle Rx Prescibed for Capacity Planning

By Bruce Hoard
CW Staff

CHICAGO — The risks involved in capacity planning can be minimized with life-cycle management, according to Jeffrey A. Bloom, director of Information System Studies at Network Analysis Corp.

Life-cycle management involves looking at a system's entire projected life and considering all the demands that will be placed on it, Bloom explained at a recent National Computer Conference session here. Such a task requires a great deal of speculation, he added.

Managers are caught in the middle when proposing systems, configurations and networks, he explained. On the one hand, they want to maximize personal benefits; on the other, they must consider the needs of the organization. "What we find is a balance," he noted. "Managers try to maximize their benefits while minimizing risks."

Techniques Bloom recommended for maximizing system effectiveness include knowing requirements, considering benefits and comparing benefits with costs. Although the technical questions may appear to have clean-cut answers, political questions may muddy decision making, he said.

In some cases, it may make more sense to go on with what currently exists because of the prohibitive costs of implementing something new, he noted.

An overly optimistic forecast of a system life-cycle could set users up for a fall down the line, the director declared. Subjective factors change more quickly than quantitative ones. In fact, there may be order-of-magnitude subjective changes, he said.

Safe Move

The safe move under such circumstances is to select a "robot alternative." A robot alternative may not be operational for all future scenarios, but may be the most likely to endure the various demands the system will be asked to meet, Bloom said.

The types of risks managers take include technical, implementation, organizational and forecasts, all of which contain assumptions that, unfortunately, are sometimes never questioned. He discussed the "saturation point" where a system gets to the point where it can no longer support additional throughput.

One way to avoid that is to keep adding capacity, he noted. "Obviously you can play many games with this and that's what engineers do all day and night."

However, if the game is not played properly and the system is overloaded, it may collapse, he commented. And complex systems are more vulnerable than simple ones.

People are frequently forced to go to a distributed data processing system, which is fine, but this also creates horrendous system analysis problems, Bloom said.

System Proposal Provokes Texas Legal Squabble

GAINESVILLE, Texas — A provision in Texas state law that allows state agencies to purchase computer systems without advertising for bids has caused a legal squabble here over whether the Cooke County Tax Appraisal District tried to get the best deal in a turnkey computer system.

Last year, the district contracted with PXQ Systems, Inc. here to supply a turnkey computer system to perform administrative functions. PXQ and the county agreed on a purchase price of $111,192.

A few months later, another Gainesville computer vendor, Meson Electronics Corp., caught wind of the sale and protested it was never given the chance to propose a similar system to the tax district.

Bids Taken

After the tax district signed the contract with PXQ, administrators decided they could get a lower interest rate on a loan from Cooke County than from a bank. The district then made an informal agreement with the county to take bids on the system, according to published reports.

PXQ submitted the same amount as the original contract, $111,192, but Meson submitted a bid $17,000 lower. The county commissioners then tabled the matter, and according to Commissioner. Kenneth Alexander, the commission may never accept either bid.

But Meson is still upset and is reportedly considering legal action. The tax appraisal district contends it did not know Meson was in the turnkey system business. Meson contends it would have let the tax appraisal district in on that fact if it had advertised for bids.

Alexander said the board could not accept either bid because Meson had the advantage over PXQ because it already knew what the firm had bid.

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But No Volunteers Step Forward

Health Pros Decry Systems Evaluation Gap

By Jake Kirchner
CW Washington Bureau

CHICAGO — Like many industries, the health care community is turning to automation to improve services and lower administrative costs. This trend is being slowed, however, by lack of unbiased health care information systems evaluation, panelists at a National Computer Conference session said here recently.

Established medical and hospital associations are the logical candidates for providing these needed evaluation services, the panelists agreed, but representatives of several of those organizations said they do not expect to become active in this area any time soon.

The American Medical Association (AMA) appreciates the need for medical DP systems for hospitals and doctors' offices, but the association is not the best organization to evaluate medical systems, Daniel K. Harris, an AMA representative, said.

Beyond the universal problem of trying to decide what hardware to buy, "evaluating the efficacy of the software is very difficult," Harris said, pointing to the complexity of large hospital systems.

No Consumer's Union

The AMA is not set up to be "a consumer's union" for medical DP, Harris said. "We're not in the patent office business." He acknowledged, however, that there does not seem to be any better alternative.

"I'm somewhat concerned that in a vacuum the government steps in," he continued. If that happens, the AMA might reconsider its position and take a more active role in advising hospitals and doctors on medical DP systems, Harris suggested.

The need is only going to get greater, he noted, as microcomputers become more popular in physicians' offices. And it is not just a matter of evaluating the systems, he said; in the case of microcomputers it is necessary to evaluate the vendor as well.

There are lots of small firms getting into the micro business, and customers need to know if the companies will be around to provide maintenance for their systems, Harris said. He added he is not against small firms succeeding, but said "IBM got to be IBM for some very specific reasons."

Harry Leopold also turned aside suggestions his organization, the Joint Commission on the Accreditation of Hospitals, get more involved in evaluating and recommending systems.

Pleading lack of resources, Leopold said the commission knows hospitals need guidance in purchasing systems and understanding the computing needs of various types and sizes of medical institutions. But, he said, "we have higher priorities for the limited resources we do have."

Other panelists, however, complained that if these and other medical organizations do not get involved, no one will. "We do not have an alternative to knowing where we can get unbiased information," remarked Dr. Marion Ball of the Temple University Health Science Center.

Ball and others said this activity should not be left up to computer vendors and societies and that health care organizations such as the AMA are shirking their responsibilities.

Their organizations are "the guardians of sick people's needs," argued session leader Karen Duncan, of Health Information Systems, Inc.

Duncan noted computers are making tremendous inroads in many areas of patient care. The AMA and other health care groups should be taking a leadership role in supporting the introduction of sophisticated technology into medical environments, she said.

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Medical Session Attendees Find Topic Had Been Excised

By Bob Johnson
CW New York Bureau

CHICAGO — When is a session on advances in medical data bases not a session on medical data bases? When it was one given here recently at the National Computer Conference.

After cutting through the moans and groans about picking on the American Federation of Information Processing Societies (Afips) for an isolated oversight, it was plain to see that the attendees at this session (which everyone thought was at least going to hint at some breakthrough in the medical world) were annoyed, to say the least.

If an attendee happened to read the description of the talk in his little blue program book, it stated that, "One of the most vital needs in the medical community is the construction of good medical data bases." The session then went on with little further discussion of the medical world.

The lead-off speaker, V.S. Alagar, gave a talk on inferences for securing statistical data bases, applicable to almost anything.

Tim Queen, of Medical Datamation, said, "The seminar dealt with data bases in general more than with medical data bases. I really didn't understand what it had to do with medicine, though."

The impressive list of medical people listed in the "blue book" did not materialize.

Rochelle McCrary, a consultant with Hollowell Medical Consultants, said one of the speakers who spoke about installing an information system was mildly interesting, but, "everyone else shouldn't have even been there. The seminar only dealt with statistical research stuff."

Out the Door

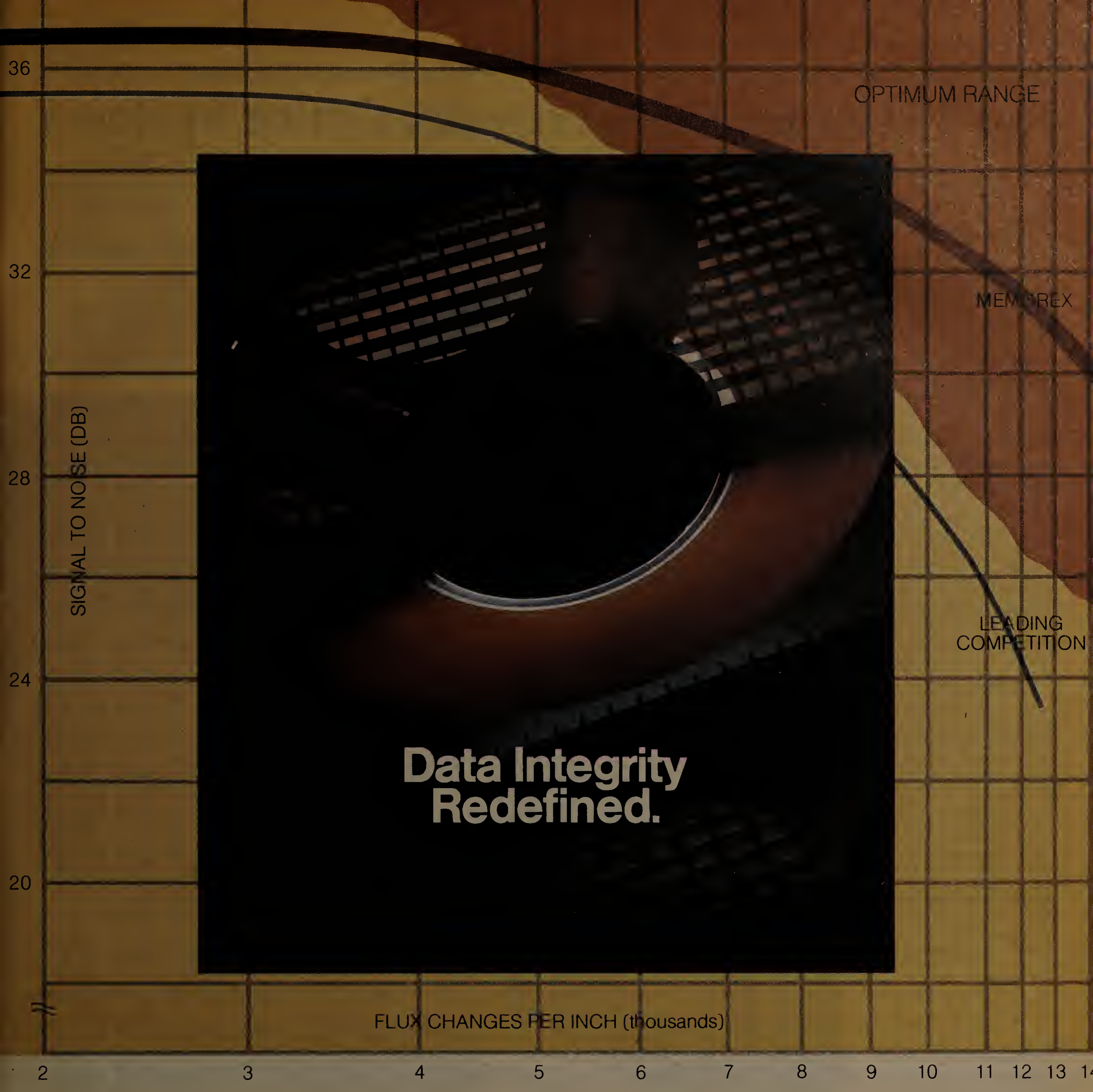
As the session continued to ignore medicine, the visitors in the Lenox Lohr Theatre began disappearing into the darkness and out the door.

Dr. Eugene Kozik, of Penn State University, said of the session, "It was a little abstract and not well introduced. The talk about research work was only a piece of the procedure. Some correlation should have been offered to the attendees."

As attendees wondered where the advances in medical data bases were, there were slides and snores, but not the information that was promised.

Lynn Perrigo, product development editor for the American Society of Clinical Pathologists, was disappointed with the session and noted the fact that there were no handouts and no hardware displays.

The three evaluation sheets handed out at the session indicated, on a scale of 1 to 5, poor to excellent, that the talk averaged about a 2.



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Need Seen for User-Friendly Office Systems

By Bill Laberis
CW Staff

CHICAGO — On the supply side, the office automation industry is suffering from acute communications deficiencies, a gross lack of equipment standards and a proliferation of whiz-bang solutions to a so-called electronic office "problem."

On the demand side, users are too often making blind decisions regarding office automation based on inadequate product information and without due regard to cost/benefit analyses.

Moreover, there was general agreement among the four panelists of a National Computer Conference session held here recently on "Combining Office Automation and Data Processing — Its Technology and Usefulness" that the successful automated office is going to have to be stocked with more user-friendly equipment than vendors are now peddling.

Missing Mark

In their attempts to jump on the potentially very lucrative electronic office bandwagon, vendors have been responsible for certain ideas about increasing worker productivity that "are suspect," according to Joseph Eichberger, vice-president of Lexitron Corp. Eichberger suggested that vendors may be widely missing the mark in rushing to design highly sophisticated equipment and applications for which there is no proven need while ignoring the basic needs of management and support staffs.

According to a survey he conducted, Eichberger said that polishing proofreading capabilities ranks high on management's improvement hit list, as opposed to the design of electronic mail or high-speed communications capabilities.

Dictionary capabilities and built-in grammar and spelling checkers can be integrated into current word processing equipment. In addition, management needs built-in electronic reminders and calendar updates to better organize time and personal files, Eichberger said.

"But the reality is that designing office equipment that is easy to use and easy to learn on is quite an elusive goal," he said.

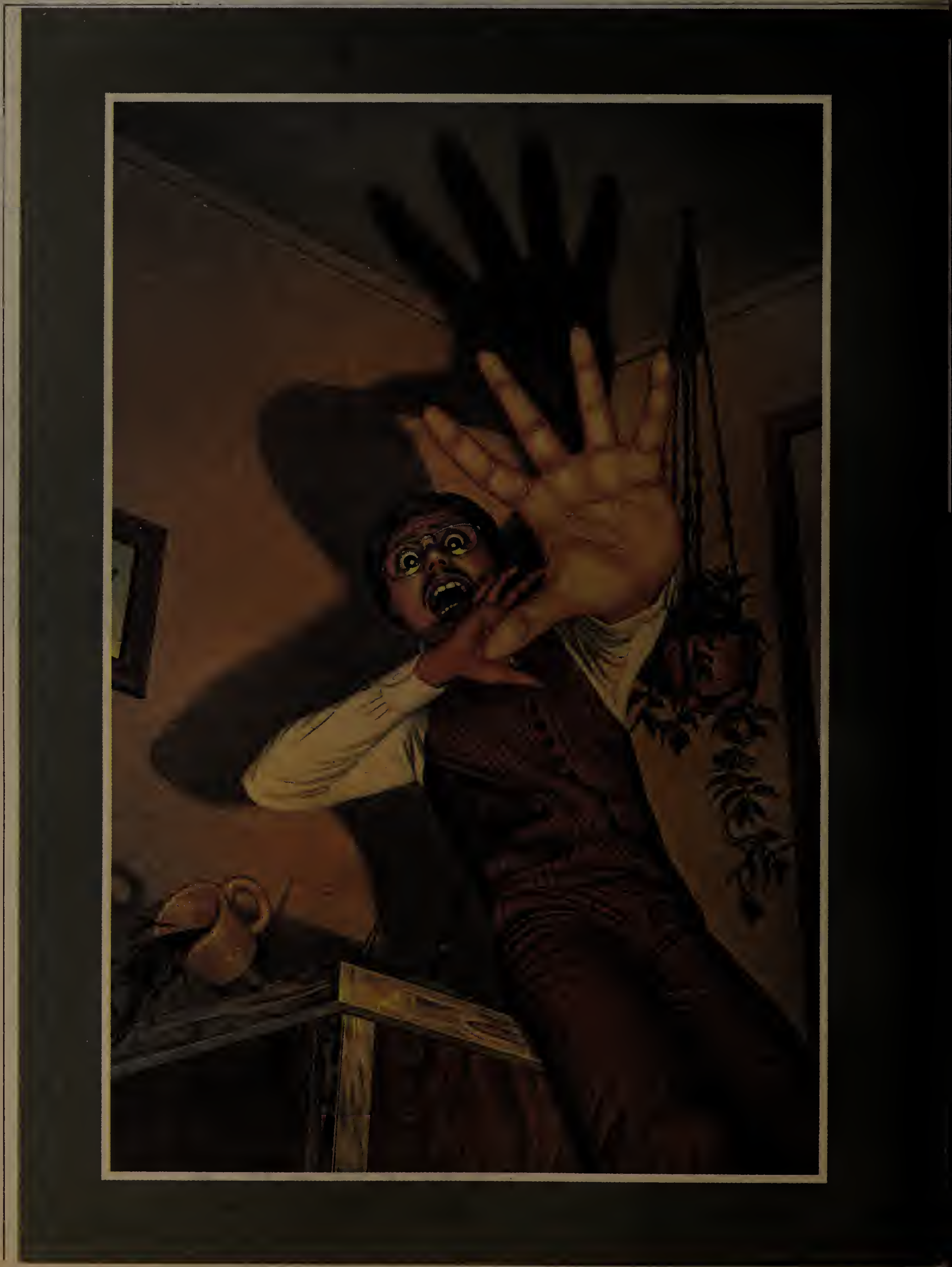
Robert Linebarger of Bel Northern Research Co. said that office automation today is running rampantly out of control, with technological advances clearly surpassing the users' needs and ability to absorb.

"The vendors are presenting office managers with an increasingly bewildering set of solutions and are placing far too much emphasis on the paper elimination issue," Linebarger said.

The industry handles communications poorly at best, he maintained, adding that vendor activity is characterized by an "alarming and disturbing lack of standards in the communications and systems evaluations areas."

He was highly critical of what he called the industry's disregard for human factors in developing and designing office equipment.

"It comes down to the vendors addressing management and support staff needs in a more responsible way," Linebarger said.



'FCC and You' Examines EMI

CHATSWORTH, Calif. — Sierracin/Power Systems, a manufacturer of dc power supplies for computer and computer-peripheral manufacturers, has published an eight-page booklet describing the Federal Communications Commission (FCC) regulations covering electromagnetic interference (EMI) emissions as they apply to computer device manufacturers.

"FCC and You" presents information, in a question and answer format, on the devices affected, what the restrictions are, the filing and effective ruling dates, rule enforcement and penalties, EMI emission levels and cost trade-offs on EMI suppression.

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To Boost Motivation

Optimize Employee-Job Match, Managers Told

By Jeffry Beeler
CW West Coast Bureau

CHICAGO — Information systems managers need to establish a mechanism for placing their employees in jobs that are optimally suited to the workers' skills and interests, a speaker noted during the recent National Computer Conference here.

Unless managers can match employees to the positions where they are happiest and most productive, motivation problems will likely arise and productivity will lag, according to Paul Daverio, who heads information systems operations for Owens Corning Fiberglas Corp.

Daverio, who spoke during an NCC program session dealing with "Motivation of Computer Personnel," based his conclusions on his own personal experience with Owens Corning Fiberglas.

In mid-1980, the Toledo, Ohio-based company administered an expanded version of a widely used Job Diagnostic Survey (JDS), which rates a given position's motivating capacity according to five key criteria. Conducted in an effort to gauge the motivation and boost the productivity of the firm's corporate computing staff, the JDS enhancement was codeveloped by Dr. Daniel Couger, a University of Colorado computer science professor who chaired the NCC session on motivating computing personnel.

From the results of the survey, Daverio and his colleagues concluded that Owens' corporate computing staff members considered top management uninterested in their ideas and suggestions for improving their department's and company's operations.

Daverio attributed the perceived indifference to management's continuing failure to communicate its objectives and priorities to its employees. Because of this massive breakdown in communication, members of Owens' corporating computing staff usually had little or no idea of the ultimate purpose of their work, nor did they understand how their efforts fit in with their company's overall plans, Daverio recalled.

Stimulation, Challenge

Analysis of the survey results also revealed a serious mismatch between the corporate computing staff members' need for job stimulation and the degree of challenge involved in their work. Although the survey proved many of the employees to have a relatively low need for professional growth, their positions were found to be geared primarily to highly motivated, task-oriented individuals who are constantly in search of new opportunities to expand and refine their technical skills, Daverio said.

To bring the employee's occupational growth needs and their jobs' motivating capacity into closer alignment, "we have shifted our emphasis to recruiting people who have a strong drive to develop themselves professionally," the Owens Corning information systems chief explained.

In a further attempt to improve the corporate computing staff's motivation and ease the employees' widespread sense of alienation from management, the company has recently adopted a new policy that requires every major executive decision and project assignment to be explained in writing to the members of Daverio's department.

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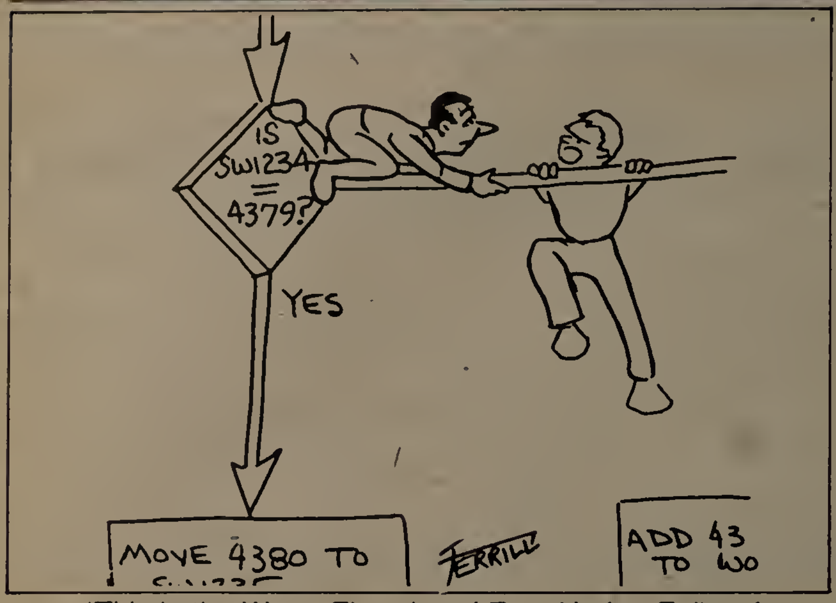

'This Is the Worst Flowchart I Ever Had to Follow.'

Word Processing Seen Answer For Lawyers' Heavy Schedule

By Bob Johnson
CW New York Bureau

CHICAGO — Lawyers in the U.S. deal with between 80 and 100 different types of documents a day and have the most significant word processing need in the country, speakers said at a session on the impact of information processing on litigation at the National Computer Conference here recently.

L. Donald Holland, an attorney for Holland, Shipes and Mitchell in Atlanta, noted that a lawyer must produce a finished work product for his client and that that product often hinges on how well he uses available information.

"Law firms do not need sophisticated word processing that includes graphics capabilities and the like," Holland said. They need hardware and software that is easy to use.

However, that marriage of software and hardware for legal applications is lacking. "Hardware should be specific, with strong word processing capabilities, heavy text editing and the ability to access prior work products," Holland stated.

Most law firms that are small operations cannot afford large CPUs. "The more intelligent terminal that they can get, the better," Holland said.

He also noted that printers are "worked to death" in law offices, which is becoming a problem. He said he hopes vendors will introduce electrostatic and laser-type printers for the office to help ease the crush.

Litigation Support

Addressing the subject of litigation support, James Wilson Bush of the firm of Meyer, Brown and Platt here explained the topic in three parts: information storage and retrieval, quantitive data analysis and litigation management planning.

"There is a helluva lot of money to be made in litigation support," Bush said, noting that as the cost of data processing hardware and software drops, small law firms will cause the market to surge. These new information resources will allow the small practitioner to compete with the larger ones.

However, Bush said, vendors must develop an understanding of the litigation process, be able to communicate DP jargon to the lawyer in legal terms, be sure not to oversell a system's capabilities, never promise what cannot be delivered, say no to improbable tasks, produce results early, try to learn the problems lawyers face, be sensitive to a firm's politics and need for confidentiality of information and listen to the lawyer's real needs before suggesting a product.

The legal process of discovery entails a huge amount of paper handling, but according to R.W. Ziegler, another attorney, the problem is really information: "Attorneys must know how to handle it effectively."

Ziegler believes the action is in minicomputers, coupled with applications that are directly responsive to the lawyer's needs. All of the session speakers agreed that the way is clear for vendors to start producing for the legal market.

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Rescuing Overtaxed Managers

AI Seen Relief for Future Industry Headaches

By Brad Schultz
CW Staff

CHICAGO — Artificial intelligence (AI) and industry may be coming to each other's rescue, a recent National Computer Conference session suggested here.

AI is a field of computer science about 20 years old that tries to develop systems that can do what the human mind seems able to do. Managers in industry are facing problems of complexity that overtax their minds, but could be handled deftly by AI systems in years to come, session panelists indicated.

Research in some areas of AI has bogged down at academic institutions, in some cases because problems turned out to be more difficult to solve than experts had assumed during the 1960s, when AI was typically seen as sparking a "computer revolution" that would change society radically. But academic AI has mainly suffered from lack of funding.

Chief Patron

The revolution may yet occur, noted AI researcher Peter Hart, who recently left the quasi-academic setting of SRI International — a think tank spin-off of Stanford University — for Schlumberger Corp.'s Fairchild Camera and Instrument Corp. subsidiary. As that move demonstrates, Big Business is coming to be AI's chief patron.

Schlumberger delivers a specialized but critical service to oil companies, analyzing the soil surrounding the bore holes created for exploratory wells. AI systems give important support for this service by doing much of the analysis more thoroughly than humans could by themselves, explained David Barstow of Schlumberger's Doll Research arm in Ridgefield, Conn.

Oil companies give Schlumberger a lot of money for bore-hole analysis, which allows them to judge the extent and concentration of oil deposits. Schlumberger therefore has a lot of money it can pour into leading-edge AI research, while sources for the funding of academic projects in AI may be tapping out.

General Motors Corp. is another large company with prominent AI projects under way, according to Rutgers University professor N.S. Sridharan. GM computer scientists have made substantial contributions, he said, to AI as applied to visual inspection of parts that travel assembly lines and to management of computer-stored data bases.

Major chemical companies, such as Dow Chemical and Smith, Kline & French, also sponsor AI research aimed at producing systems for analysis and synthesis of chemical compounds, Sridharan pointed out.

Sridharan and State University of New York at Buffalo's L. Thorne McCarty have developed AI systems that store the rules implicit in corporate tax laws and, through inference of those rules, suggest a sequence of contractual arrangements by which a company can best attain its stated objectives.

AI systems generally begin as software programs, commonly written in Lisp, that express rules, operations and things that operate in terms of logic rather than the instruction sets peculiar to such popular commercial languages as Cobol and Basic. Hart observed that the difference between AI programs and what are often called "smart" programs, designed for interactive DP, is arguable and vague.

However, he joined Texas Instruments, Inc.'s Tom Kehler in noting two fundamental benefits of AI for business users: AI systems allow technical experts to tackle more complex problems; and they allow nonexperts to interact with computers without special prior training.

As Kehler put it, AI systems "lower the floor" of computing's utility for novices and "raise the ceiling" of utility for experts.

These benefits appear quite timely, for commercial users across the nation have showed they want more novices involved with management information systems and more mileage out of the highly paid experts thay are compelled to hire.

Hart, who is establishing a new AI laboratory for Fairchild Camera, said the private sector's demand for AI specialists cannot be filled because of academia's limited ability to produce them. The shortage of commercial AI professionals is especially acute at the leadership level, Hart added.

Unix Users To Meet July 9

STANFORD, Calif. — A two-day meeting of the Unix operating system users group, called "/usr/group," is slated for July 9-10 at the Los Angeles Marriot Hotel.

The meeting will include vendor demonstrations and discussions concentrating on end users, licensing, standards, vendors, publications and programs dedicated to systems that use Unix and "C" language.

Further information is available from /usr/group, P.O. Box 8570, Stanford, Calif. 94305.

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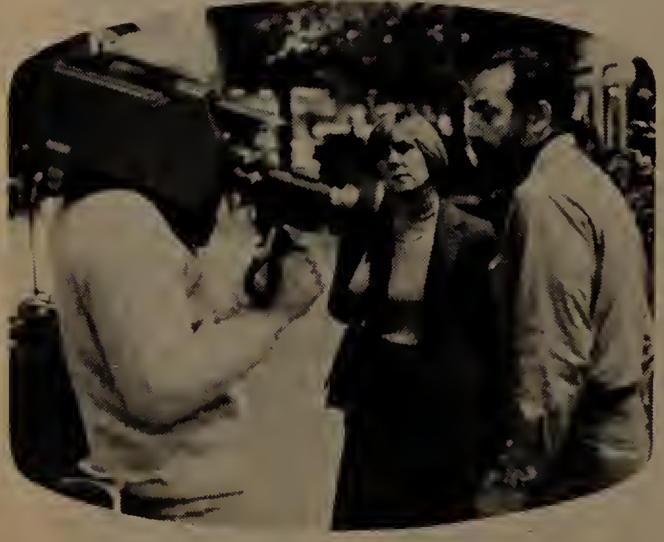

The computer industry is experiencing almost unbelievable increases in productivity. As one expert has said:

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COMPUTERWORLD

Planning, Debugging Methods Stressed

Fresh Approaches Urged for Programmer Ed

By Jeffry Beeler
CW West Coast Bureau

CHICAGO — Current approaches to undergraduate-level programming instruction are clearly failing and need to be replaced with alternative methods that embody fresh educational concepts, two speakers said here during a recent National Computer Conference program session.

The speakers, Mark Miller of Texas Instruments, Inc. and Elliot Soloway of the University of Massachusetts, described their respective employers efforts to independently develop an intelligent computer-aided instruction (CAI) system that stresses planning and debugging rather than language constructs.

The TI and University of Massachusetts systems mirror the knowledge and thinking processes inside an expert programmer's head and in so doing enable programming students to explore alternative solutions to classroom problems, according to Miller, who works as a TI branch manager.

Most traditional CAI systems, by contrast, reportedly interrupt and prompt students with error messages when they try to solve programming problems in novel ways, even if the unconventional solutions are just as valid as the standard ones.

Unlike most existing CAI systems, in which students typically begin a solution to a programming problem by writing a line of code, Miller's and Soloway's systems require aspiring programmers to start their exercises by planning a loop.

"This emphasis on planning closely parallels the thinking process that an expert programmer has to go through in real-life programming situations," according to Soloway, a University of Massachusetts assistant professor of computer science.

"If a student begins a solution to a problem by entering a line of code, it's very difficult for a CAI system to know what a student is doing and where he has possibly gone wrong because the system doesn't know what the student's planning structure is."

The need for more intelligent alternatives to conventional CAI systems is mounting rapidly. "In just a few years, nearly every college freshman will be required to take some kind of programming course," Soloway added. "So it's very important that we find some new ways of teaching people how to be programmers."

CAI 'Coach'

Also speaking at the session "Intelligent Computer-Aided Instruction" was John Seely Brown, a University of California (Irvine) assistant professor who described his efforts to develop a CAI "coach" that allows students to solve programming problems and diagnose many of their own errors with a minimum of systems intervention.

Like a coach in collegiate athletics, Brown's CAI system doesn't interrupt a student's activities every time the individual makes a mistake or begins floundering. Instead, the system confines its intervention to certain "choice moments," Brown said.

The rest of the time the "coach" allows the student to solve his own programming problems and thus learn by doing.

One of the key requirements of Brown's CAI system, then, is that it provide enough intelligence to decide when to intervene and when to leave a student alone.

Developing System

To develop his system, Brown began by constructing a procedure that describes the correct method for performing a given programming "micro-skill." From that procedure, he then "hung" a number of subprocedures that represent all the possible ways of doing the same microskill incorrectly, Brown said.

Next, he repeated the process for other microskills and combined all the resulting procedures and their associated subprocedures into a "map" that describes how a major programming function should be performed and that anticipates when a student might make a mistake.

The result is a "differential model" that contrasts a student's and an expert's solution to a similar programming problem. Such a model reproduces a student's efforts at problem solving and thus aids in diagnosing the individual's processing errors, Brown said.

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EDITORIAL

Saving Grace

For the moment, the Reagan administration apparently has abandoned plans to store, in a giant data base system, information on 25 million Americans authorized to receive welfare payments [CW, May 11].

Assailed by the American Civil Liberties Union (ACLU) as a threat to privacy rights, this scheme was reportedly proposed to the House speaker in a document signed by Richard S. Schweiker, secretary of the Department of Health and Human Services [CW, April 20]. Proponents asserted that the so-called National Recipient Information System (NRIS) would allow law enforcers to spot cases of welfare fraud.

With NRIS, computer technology would swiftly verify the eligibility of someone receiving, or trying to receive, financial assistance from the government. But critics have charged that NRIS would violate privacy law, allowing government to monitor confidential data on citizens without their consent.

Moreover, even well-intentioned operators of NRIS might not notice an accumulation of errors in subject records. A few mistaken data entries could lead to false arrests or unwarranted harassment of people who are financially ill-prepared for courtroom confrontations.

Pressure from groups like ACLU apparently forced the Reagan administration to drastically revise its scheme to deter welfare fraud through computer technology. Schweiker's department has submitted a new proposal to Congress that does not call for creation of new computerized data files.

Instead, Health and Human Services is asking that local welfare agencies have access to existing data files of four large federal agencies: the Social Security Administration, the Office of Personnel Management, the Veterans Administration and the Railroad Retirement Board.

Potential billion-dollar boondoggles like NRIS sprout like toadstools with each change of Congress. The Select Commission on Immigration and Refugee Policy has endorsed plans for a Work Permit Authorization Enrollment and Verification System (WPAEVS) that would store records on all Americans who may work lawfully [CW, Feb. 9] and the Federal Bureau of Investigation has tried many times over the years to expand its computer-based National Crime Information Center, a stockpile of arrest and conviction records.

The Reagan administration seems no more concerned about privacy rights than the Carter administration, which failed to create a way for the public to know whether federal agencies comply with laws passed to protect privacy rights. But the Reaganite commitment to radically reduced federal spending could prove a saving grace if it makes rationalization of billion-dollar expenditures on an NRIS or a WPAEVS all but impossible.

Despite what advocates of such systems may claim, they really would cost billions of dollars and could only expand the government President Reagan has described as "simply too big."

DATA PAST

Five Years Ago
May 17, 1976

NEW YORK — The government's use of the Federal Bureau of Investigation (FBI) to interview people who would be called as witnesses by IBM in the antitrust trial against that firm was "coercive," "unconstitutional" and an abuse of government power. So charged IBM's lead attorney, Thomas D. Barr, in a closed-door meeting with Judge David N. Edelstein.

Ten Years Ago
May 19, 1971

ATLANTIC CITY, N.J. — The Spring Joint Computer Conference opened here. The meeting was expected to draw up to 30,000 computer specialists and users.

'The annual Caribbean cruise, year's supply of liquor, company car, personal home computer and live-in maid sound okay, but does the Aspen ski chalet come with lift privileges?'

LETTERS

Vying for Record

The Albany Savings Bank is to be commended for its expeditious installation ["Bank's DP Center Up in Record Time," CW, April 27]. It is not a record, however, except possibly for banks.

The Retired Officers Association (299,000 members) had the same deficiencies with a service bureau environment. On June 2, 1979 our board of directors authorized an in-house computer and word processing system (a Digital Equipment Corp. PDP-11/70). It was delivered Aug. 2 and accepted Sept. 14 (two months for delivery, six weeks for installation and testing).

Full operational status and file takeover was effective Dec. 1, 1979 — elapsed time six months from authorization, 10 weeks from equipment delivery.

The problems included expanding the data base and completely redesigning and/or adding reports to include essential management data that could not earlier be accessed.

M.K. Wheeler
Deputy Director
Administration and Membership
Retired Officers Association
Alexandria, Va.

A Bit Disgruntled

I read with interest the editorial "Serious Threats" [CW, April 27] — that is, until I reached the final paragraph stating that the costs of implementing the National Recipient Information System (NRIS) and the Work Permit Authorization Enrollment and Verification System (WPAEVS) would be a burden on taxpayers.

To this statement, I say, "Bunk!" Nobody will concur more quickly (or authoritatively) than the federal government itself that because of "oversights, inequities, blatant omissions and outright fraud," the taxpaying U.S. citizen is being ripped off for billions of dollars annually by the very people who will not be included in the WPAEVS system and those who will be in NRIS.

Nobody treasures his personal privacy more than I, but frankly, I'm getting a little disgruntled over having to work "for free" until mid-May to pay for it!

Thomas Beamesderfer
Sherman, Texas

Design Deficiency

The argument of efficiency once again reared its head in the GOTO debate, this time in Ronald Castonguay's letter [CW, April 27]. Castonguay correctly pointed out that in a segmented Cobol program run on a small computer, a PERFORM . . . UNTIL sentence which has as its target code in another segment may cause thrashing. However, the PERFORM verb is not the culprit! In the situation described, *any* repeated transfer of control across a segment boundary will cause thrashing.

The problem, then, is not the use of a specific Cobol verb, but rather a design deficiency in the program. Castonguay's solution, moving the loop control into the segment where the code is, is the correct one; but it could just as easily have been implemented without a GOTO. Just move the PERFORM . . . UNTIL into a separate paragraph in the target segment and pass control to it with an unqualified PERFORM.

Bob Brown
Chief, Information Systems
Medical Association of Georgia
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- **80** Education/Medicine/Law
- **85** Government - Federal/State/Local
- **90** Printing/Publishing/Other Communication Service
- **95** Other ______

TITLE/OCCUPATION/FUNCTION

- **11** President/Owner/Partner/General Manager
- **12** VP/Assistant VP
- **13** Treasurer/Controller/Finance Officer
- **21** Director/Manager of Operation/Planning/ Administrative Service
- **22** Director/Manager/Supervisor DP/MIS Srvs
- **23** Systems Manager/Systems Analyst
- **31** Manager/Supervisor Programming
- **32** Programmer/Methods Analyst
- **41** Application Engineer
- **42** Other Engineering
- **51** Mfg Sales Representative
- **52** Other Sales/Marketing
- **60** Consultant
- **70** Lawyer/Accountant
- **80** Librarian/Educator/Student
- **90** Other: ______

Detach here, fold, and place in post-paid envelope attached through binding.

READER COMMENTARY/George Pitagorsky

Industry Caught Up in Avoiding Change

As DP professionals (managers, programmers and analysts specializing in computer use and software development), we are facing change that will affect the way we work, our careers and our relationships with our organizations.

Because change is difficult to deal with, we have made our institutions and organizations fortresses against it.

A circular effect is created. First the organization freezes its procedures, its structure, its values and its objectives. As a result, members freeze their personal procedures, structures and objectives to coincide with those of the organization. This, in turn, inhibits the organization from changing (the organization, after all, is a reflection of its members).

We have seen American industrial organizations fall into this cycle. The automobile industry is an obvious example. Inability to adapt to a changing marketplace created a situation that permitted competitors to enter the marketplace and gain advantage.

Industry and government are responding by beginning an outward change while creating an environment protected from competitors who are more adept at managing, creating economical and human-engineered cars and adapting to change.

Software Development Changes

Our DP organizations face a problem similar to the one faced by the auto industry. User needs and desires are changing, new methods are making existing organizations and practices obsolete and a large investment in the status quo stands as an obstacle to change.

Over the 15 or 20 years that there has been a serious commercial software development industry, work methods have focused on highly skilled programmers working in project groups to produce custom software.

We have developed a craft-like industry (which we like to call a profession). Salaries are high, as is the number of people in the business of creating commercial software. All industry predictions agree that the supply of skilled programmers will fall short of the demand.

Now, between the availability of software development tools like program generators and the use of "software factory" methods, there looms the possibility that the entire nature of software development will change. There can be a quantum jump in software development productivity.

Imagine a software development organization based on the use of automated tools, model programs (skeletons) and packaged software.

The staff consists of five or six "paraprofessionals" for each programmer/analyst. The paraprofessionals earn $12,000 to $15,000 per year (not considering inflation) and provide a source of programmer/analysts as they mature and are trained.

The initial training of a paraprofessional requires weeks, not months or years, and he becomes productive almost immediately.

With appropriate tools and methods, the number of people required to support software needs is at least half the number required now. Those remaining require less experience and training than existing programmers.

The quality of the system provided by this new organization is significantly higher than that of systems produced now. Maintenance is simpler, far less costly and more timely.

The new organization is self-perpetuating, with people moving naturally from skill level to skill level. Turnover and its effect are reduced because of the lower skill and experience levels required of programmers and the nature of new work methods.

Fantasy or Reality?

Is this imagined organization a fantasy, joining such utopian ideas as chief programmer teams and structured walk-throughs? I think not.

Already small computer users are experiencing changes that enable them to use nonprofessionals as DP

(Continued on Page 46)

SOFTLINE/Werner L. Frank

The Big Apple Show

During a recent trip to New York, I had the opportunity to be a guest at Apple Expo '81, a four-city, road-show event sponsored by Apple Computer, Inc. on behalf of its approximately 1,000 dealers. The Big Apple was the right setting for this extravaganza.

The three-day conference, ending with an invitation to the public, carried the theme "tools for today," reflecting the new emphasis by most producers of microprocessor-based computing systems. The name of the game is to become more of a provider of solutions, oriented to specific industry or specialty groups.

For example, Apple was promoting software-based solutions for the following functions: business planning; personal planning; education, instruction and administration; and small business data processing.

With a current user base of 200,000, estimated to become 300,000 by the end of 1981, it is not hard to understand why a substantial subindustry has arisen in support of the Apple hardware. Today, some 100 hardware companies and 200 software-oriented enterprises are providing aids, peripherals and solution products in connection with the Apple computer.

The cooperative relationship between Apple Computer and these supportive businesses is unique for the industry. Indeed, Apple invited these organizations to participate during the Expo and about 35 companies displayed their offerings.

The major impression one carried away from the exhibits was the impact of the variety of innovative and complex hardware and software engineering advances that have emerged from this lowest end of the DP spectrum. It is bewildering to note the advances derived from interfacing such a variety of peripheral devices. The resulting capability often challenges the functionality present in today's big-machine environments.

Storage Devices

First there is the variety of fast-access storage devices, ranging from the ubiquitous floppy diskette systems (5.25- and 8-in. size; single, double and even quadruple densities; and single- or double-sided) to the 8- and 14-in. hard disk systems and the 5.25- and 8-in. Winchester-type storage units.

Storage capacities now easily range from .5M byte to 20M bytes — and in combination to easily 100M bytes, all accessible from a single computer. But most attractive are the prices, which can be around $5,000 for a 20M-byte capacity.

Printers are the second large category of peripherals tremendously influenced by the widespread use of the low-end personal computer. Shown at the Expo were, for example, versatile matrix and full-character printers suitable for bulk production, word processing and graphics output.

Amazing Versatility

Even more amazing is the versatility of the interface engineering, which permits so many peripherals to adapt conveniently to a variety of CPU offerings via low-cost interface cards. Included in the displays were multifunction communications cards, special key entry devices and bar code word readers.

Both software and hardware adaptations have demonstrated how quick and relatively easy it is to modify or augment a computer. By adding a logic card, which in itself may be a computer, the entire host system can be modified. Thus, for example, the Softcard produced by Microsoft will convert the Apple's 6502 chip-based performance to a Z80/8080 chip environment, which can then execute the rich software body existing for these latter chips under the widely used CP/M operating system.

A more avant-garde offering was the VET/2 voice entry terminal from Scott Instruments. For less than $1,000, a microphone and attachable unit can be hooked to the Apple or to Radio Shack's TRS-80 to replace key-

(Continued on Page 48)

HUMAN CONNECTION/Jack Stone

Employee Performance Keyed to Self-Appraisal

Over the past six months, this column has discussed the progress of a project that deals with the reorganization of a user department. Project results will soon be applied to the DP department. The last step in the project is now complete, and this column will consider development procedures and results that have not appeared before.

Part 1. Organization Statement.

When I began to prepare a new statement of the organization functions, I found a wide range of opinions as to just what the organization was supposed to be doing. To avoid entering a political hot box, I simply integrated all the proposed functions into a draft statement, using my trusty word processor, and let senior management negotiate the content of the final statement with the department managers and supervisors.

Part 2. Job Descriptions for Managers and Supervisors.

A job description has two parts: the tasks to be accomplished in the job, termed "job elements," and additional factors that characterize the nature of the job, such as knowledge, supervisory controls, guidelines, complexity and so on.

The approved organization functions (part 1) were sufficiently detailed so that I simply copied them over as job elements for the department and subdepartment managers, a straightforward matter using a word processing file. The word processing system helped me make sure I didn't duplicate functions between departments or drop any along the way.

Part 3. Job Descriptions for Employees.

There are six levels in the employee career ladder and widespread complaints about how they were developed in the old job descriptions. The basic problem was the absence of standards.

I selected one department and drafted a new ladder for it which was used as a model for the others. The steps were consistent and, at the same time, the functional differences among the steps were sharply defined. To accomplish this, I pulled a copy of the highest step position

(Continued on Page 44)

LETTERS

Two Points Refuted

I would like to comment on two statements in the April 27 issue.

First with reference to "Bottom-Up Yields Precision" in a three-part series on software testing by A.F. Grilz of Kroy Industries, Inc.: Grilz gave the strangest description of top-down testing I have seen yet. He described top-down testing as being a practice of testing first the highest level in the hierarchical structure of the system. If that tests out correctly, then testing is stopped at that point upon the assumption that the rest of the system is correct.

This in not, in fact, how most practitioners interpret the technique of top-down testing. The normal interpretation is to test the top level first and then, when that is correct, to test the next level down until that is completely satisfactory and so on until all the levels in the system have been tested from top to bottom — hence, top-down testing. Grilz's idea of merely testing down to the point where satisfaction is achieved seems to be a very unsatisfactory subset of complete top-down testing.

In the same issue, there was a letter from Ronald N. Castonguay, once again perpetuating the myth that structured design methods mean eliminating GOTOs. Once and for all, Dijkstra, Baker, Yourdon, Jackson, Myers, Dahl et al never said that GOTOs were forbidden in structured programming. They all said clearly and repeatedly that GOTOs need to be used, but must be used in a disciplined and logical fashion, *not* in the haphazard "traditional" fashion that causes the "spaghetti code" so many of us have learned to hate. Any programmer knows that GOTOs, branches or jumps to other parts of the code under any name are required in order to make the program understandable and efficient.

The myth that structured programming means eliminating GOTOs will in itself continue to make structured programming unacceptable to those who don't understand that there is more to structured design than simple omission.

David King
Vice-President
Security Pacific National Bank
Glendale, Calif.

'Slam' Poorly Chosen

It's not often that I write to a periodical with a criticism of any kind, much less with an objection to a choice of wording. However, I must take exception with the wording of the headline "ACLU Slams Reagan's Data Bank Plan," which appeared on Page 1 of the April 20 issue.

The word "slams" or a conjugation of that has appeared several times in headlines in the past. I think that particular word is nebulous, vague and not descriptive of what actually occurred. An alternative to that headline might be "ACLU Faults Reagan's Data Bank Plan" or "ACLU Opposes Reagan Data Bank" or some similar construct.

Brend C. Williams
Senior Analyst
Soft-Pack, Inc.
Santa Clara, Calif.

Performance Keyed to Self-Appraisal

(Continued from Page 43)

onto the word processor's screen and edited it progressively "downward."

After client review and approval, I used the word processing global search and replace functions to replace department names and subject matter areas and thereby generate job descriptions for all the other departments, except for a small number which were associated with a special technical support department. Even in this latter case, I generated the ladder in the same manner as the first model.

Part 4. Performance Appraisals.

The first thing we did was establish the principle that employees would be measured on "products." We then set uniform standards of performance — using the six performance factors of results, quality and completeness, timeliness, method, manner and workdays applied — in terms of five performance levels, outstanding through unsatisfactory, with corresponding numeric ratings of 5 through 1.

We have decided to apply the same system to all employees, including managers and supervisors. In addition, by including performance appraisals as a critical evaluation factor in the managers' performance, there is assurance that the employee appraisals will be conducted on time.

We also made substantial improvements in the performance appraisal worksheet (described in an earlier column) by integrating all appraisal data onto a single sheet. The first two columns on the sheet are for the job element/product and product due date(s). Here the employee lists all the products and delivery dates within job element on which he is to be measured and which have been signed off by the supervisor. Then the employees rate their *own* performance in terms of the performance factors using the numeric performance levels, calculating totals and averages.

The column on the far right is used for supervisor ratings and comments. The worksheet, however, is not completed just once an appraisal season, but is submitted as a confidential part of the periodic progress report.

This strategy has several advantages for management:

1) There is no question that the employees are continually focused on the approved set of products.

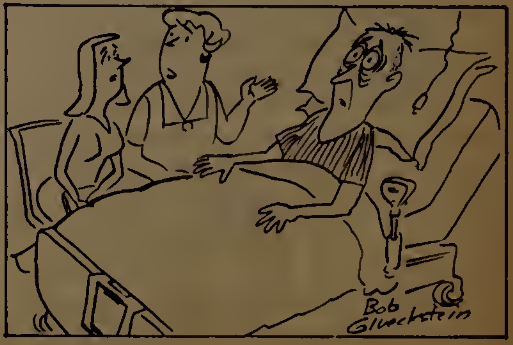
2) Employees keep track of their own progress, relieving management of this detailed responsibility.

3) All employees measure their own performance using one set of criteria and one methodology.

4) Supervisors are given the capability to negotiate product-by-product performance ratings.

5) The worksheet provides a cumulative and current record of the products completed and employee performance.

6) The annual, anxiety-filled performance review turns into a perfunctory get-together.



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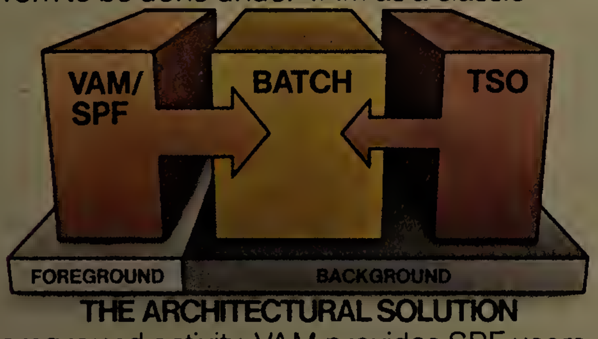

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Industry Caught Up in Avoiding Change

(Continued from Page 43)

managers and DP coordinators.

Several of our clients are able to replace the programmer/operator/manager who earns $25,000 to $35,000 per year with a $15,000 to $20,000 coordinator using turnkey systems. Systems like IBM's System/34 and System/38, Sperry Univac's System 80 and others are making this sort of change a reality.

There is reason to believe that the same thing will happen in larger organizations on the software development level.

The effects on DP managers will be profound.

Most managers' rewards increase as the number of people and the level of skill and experience of those people increases. A potential change reducing the size of the DP organization and replacing programmers with paraprofessionals is threatening to even the most company-oriented individuals.

Management career path changes and motivation programs are necessary to create an environment conducive to change. Compensation plans based upon cost reduction and service improvement rather than budget size are one possibility.

Programs to educate DP management in the emerging tools and methods, to train them in dealing with paraprofessionals as well as professional work groups and to orient them toward changing corporate goals will be necessary.

DP managers must become change agents in their organizations, leading the staff in adopting new tools and methods.

As anyone who has implemented an application system knows, a new system is doomed to failure without the support and leadership of user management. In this case, the user is the software development organization and the system is the software development methodology.

DP managers have commonly worked under the pressures of tight budgets and schedules (often self-imposed, but nonetheless difficult to deal with). This has led to a reactive mode of operation. Little or no time has been available for reflection, research and orderly change.

Orderly change requires time and effort. If there is to be improved productivity, service and system quality, there must be a commitment by corporate management that provides support resources and motivation for change.

Effect on Programmers

Programmers are the key people in software development, the princes and princesses of the industry. The effect of impending changes on programmers can be as significant as the effect on typesetters of the linotype's introduction.

Application programmers will be affected in two aspects: the nature of their work and career paths and salary levels.

Program generators and the use of program and system models (skeletons) will eliminate a significant amount of coding in procedural languages and will minimize program and system design requirements.

This is significant in that presently, procedural language coding and related debugging is programmers' primary activity. Further, system and program design activities are among the most intellectually demanding and important tasks in software development.

The level of training and experience required for effective use of program generators is far less than that required for procedural language coding. A bright high school graduate given clear specifications, a few weeks of training and a reasonable level of supervision should be able to "program" most applications.

The changes in work methods and skill levels will be felt in the salaries and career opportunities for programmers.

The need for systems analysts and senior programmers to prepare detailed user-level specifications will remain and probably grow. Understanding of user business needs, the capabilities of automated tools and the ability to describe information clearly in a well-structured manner will become increasingly valuable.

The ability to supervise and direct the software generation effort will also remain vital.

The successful software development organization will create a career path that permits organic growth into analytical and project management positions by the people working on the system generation tasks.

There are two somewhat contradictory responsibilities on the part of organizations employing programmers:

- The responsibility to reduce costs, improve productivity and improve the quality of the computer systems in use.
- The need to provide a smooth, people-oriented transition.

The process of fulfilling these responsibilities begins with corporate-level research into new methods and the definition of a set of goals — a corporate management wish list. The process of re-educating and motivating DP professionals must begin with the results of this research.

Pitagorsky is president of the consulting firm People and Solutions, Inc., based in New York.

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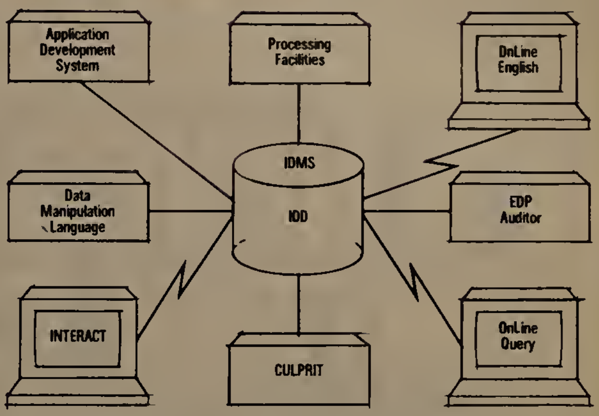

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A Taste of the Big Apple Show

(Continued from Page 43)

board entries with voice. The demonstration was astounding. Sets of 40-word vocabularies were dynamically generated and subsequently used, in a voice-driven mode, during execution of programs normally requiring input via the terminal's keyboard.

The vocabulary must be associated with a particular voice whose signature or template is established by repeating each desired word four successive times to the VET/2 preprocessor. Once the word patterns are "learned" by the system, the user can speak to the computer, employing this vocabulary whenever external keyboard prompts or commands are solicited.

The technology works and the system is a beautiful example of bringing digital computer software and hardware together to solve a difficult and intriguing analog problem. Now, one only needs the proper application in order to exploit this facility.

Which brings us to one more significant hardware advance in the area of communications. Nestar Systems, Inc. of Palo Alto, Calif., offers the Cluster/One network, which allows up to 65 connected devices to talk to each other, be they computers or peripherals. The architectural approach of this networking system is termed "Ethernet-like," where local serial loops can be combined with daisy-chain branches. This ensures that no single device failure can bring down the entire system, as would be the case with star-type configurations or shared resource systems that multiplex use of a single CPU or commonly accessed storage facilities.

Pure software offerings were also much in evidence, ranging from languages to accounting applications to microprocessor-sized data management systems that can compete with offerings on mainframes.

The software is distinguished for its user-friendly attributes as well as its interactive, screen-driven form. In this sense, software for the microprocessor is far advanced over software now available for the mainframe and many minicomputers. Many of the software vendors depend, however, upon the existence of the Softcard feature in order to be able to run their programs on the Apple. This is the case for Micro Focus, present at the Expo and offering its CIS Cobol, certified by the General Services Administration, together with its Forms facility. These allow the creation of an interactive application "in 20 minutes."

Another vendor, Retail Sciences, Inc. of Atlanta, also offered through Softcard its six-package business DP set, called Peachtree Software, as well as its newly acquired word processing package, Magic Wand. This vendor, along with Apple itself, is only one of many offering general ledger, accounts payable, accounts receivable, payroll, inventory and mailing list packages.

Native Mode Tools

But there also is independently supplied software operating in the native mode on the Apple. A good example is DB Master of Stoneware Micro Computer Products of San Rafael, Calif. This program is a nicely done data management system.

With more than 1,000 systems now in use, the producers have had sufficient feedback to lead to a significant new release that will enhance the capability even further.

Priced at $229, the new Release 3.0 will be an attractive piece of software in the category of application generators, so popular at present with respect to the larger computers.

The folks who brought us Visicalc also announced new products. They included Visiplot, Visitrend, Visidex and Visiterm in addition to a newer Visicalc 16-sector version. This suite of software will facilitate graphics, statistical forecasting and "index card" operations and provide data communications.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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Random Notes

'IMCS' Versions Available For Basic Plus 2, VAX Basic

CINCINNATI — Interactive Information Systems, Inc. has announced the release of two versions of its Interactive Manufacturing Control System (IMCS) for Basic Plus 2 and Digital Equipment Corp. VAX Basic users with RMS.

The releases were designed to utilize the DEC-supported layered products line of systems software and utilities. IMCS is priced at $89,500, the firm said from 10 Knollcrest Drive, Cincinnati, Ohio 45237.

Payroll Package Offered For DEC PDP-11 System

ST. CLOUD, Minn. — Paymate, a payroll package for Digital Equipment Corp. PDP-11 systems, is being offered by Computer Concepts & Services, Inc., a software firm.

Paymate features multidivisional and multicompany processing; user-defined pay and deduction reporting; fiscal, calendar and quarterly data accumulated; and tax table directly maintainable by user.

Paymate costs $2,750 from Computer Concepts and Services, at Metro 221-0239, Box 1082, St. Cloud, Minn. 56302.

Package Aids User Training On PDP-11, VAX Systems

BEDFORD, Mass. — Clyde Digital Systems has announced a software package for interactive new-user training and trouble-call support for Digital Equipment Corp. PDP-11 and VAX-11 systems.

The package allows users at remote keyboards to call for a support manager's aid should a new application fail, the vendor said.

It costs $595, through P.O. Box 348, Bedford, Mass. 01730.

'Finar' Version 5.05 Runs With Basic Plus, Plus 2

DENVER — Version 5.05 of Finar, a financial analysis and reporting language that operates on Digital Equipment Corp. PDP-11 and VAX-11/780 computers, was announced here by Finar Systems, Ltd.

The Basic Plus version of Release 5.05 of Finar costs $20,000 for an initial license and an additional $2,000 for maintenance. The Basic Plus 2 version is priced at $25,000, with $2,500 for maintenance.

A Level 5 version for the VAX system can be licensed for $29,000, with $2,900 maintenance from Suite 2-300, 6,000 E. Evans St., Denver, Colo. 80222.

Plan Outlines 14 Tips On Package Installation

By Bill Sims

Special to CW

The following 14-point plan is essentially a set of tips that will help the DP manager facing the installation of a software package increase his chances of success. These tips are essentially traditional in nature and aimed primarily at projects that range from three months to two years in duration and involve individuals from various organizational areas.

1. The business plan. The formation of a definite business plan is highly recommended in order to ensure goal consistency between the DP department and end-user areas. This overall corporate plan should be formalized before selecting any software package.

2. Software selection. A good general approach will include a procedure that provides qualitative and quantitive items for measuring product alternatives against specific business needs. Programming language, documentation level, education offered by the vendor, package maintenance and product warranty should be evaluated during the selection process.

3. The vendor contract. Remember that "all things are negotiable." Select the items most important to your installation and determine what you are willing to give up, if necessary, in order to get them. It is also advisable that the attorney who reviews the document be someone who is familiar with computer-related contracts and terminology.

4. Task planning. Establish a list of all activities required to complete the project. For the first six months of the project it is advisable to break these tasks into one-week segments.

5. Task estimating. DP technicians have a tendency to dramatically underestimate the elapsed time required to complete a task. Thus, it is advisable to have each task independently reviewed by more than one person. If there are significant discrepancies among the submitted estimates, some discussion will be necessary in order to generate a realistic estimate for each task.

6. Package integrity. A copy of the software system as it is originally received from the vendor should be kept as the base system for the installation. Changes and enhancements should be made via updates that are applied to the base system each time a program is compiled. This allows thorough testing of the base system minus in-house modifications. It also means that vendor-provided updates can be tested before applying the in-house modifications.

7. Package modification procedures. It is recommended that a steering committee of senior company officers be established to review all system modification requests when the project is large enough to warrant it. This group has an overall perspective that may result in modifying company procedures or policies rather than changing the system.

Purchasing and installing software packages is a process fraught with pitfalls for the information systems manager. Based on 16 years of DP and management experience, Sims has a set of suggestions that may be useful.

8. Package modification documentation. Any change affecting any module requires formal documentation. However, it can be kept as simple as allotting a file folder containing all comments, memos and other written documentation to each program.

9. Project monitoring. Projects should be monitored on a routine basis via status reports from all people with task assignments. These forms provide formal feedback that can be summarized for reports to top management on an exception basis and management can react to this feedback by supplying or shifting resources to meet changing requirements.

10. What to monitor. Ask for three items of information to monitor each task. What percent of the task has been completed? How many man-hours have been expended on the task during the current reporting period? Are you still able to meet your target date? Reviewing these results should include examining the relationship between the three answers. In other words, a 10-day task that is 50% complete should have required approximately five days of effort.

11. Intermediate target dates. It is extremely important that intermediate target

(Continued on Page 51)

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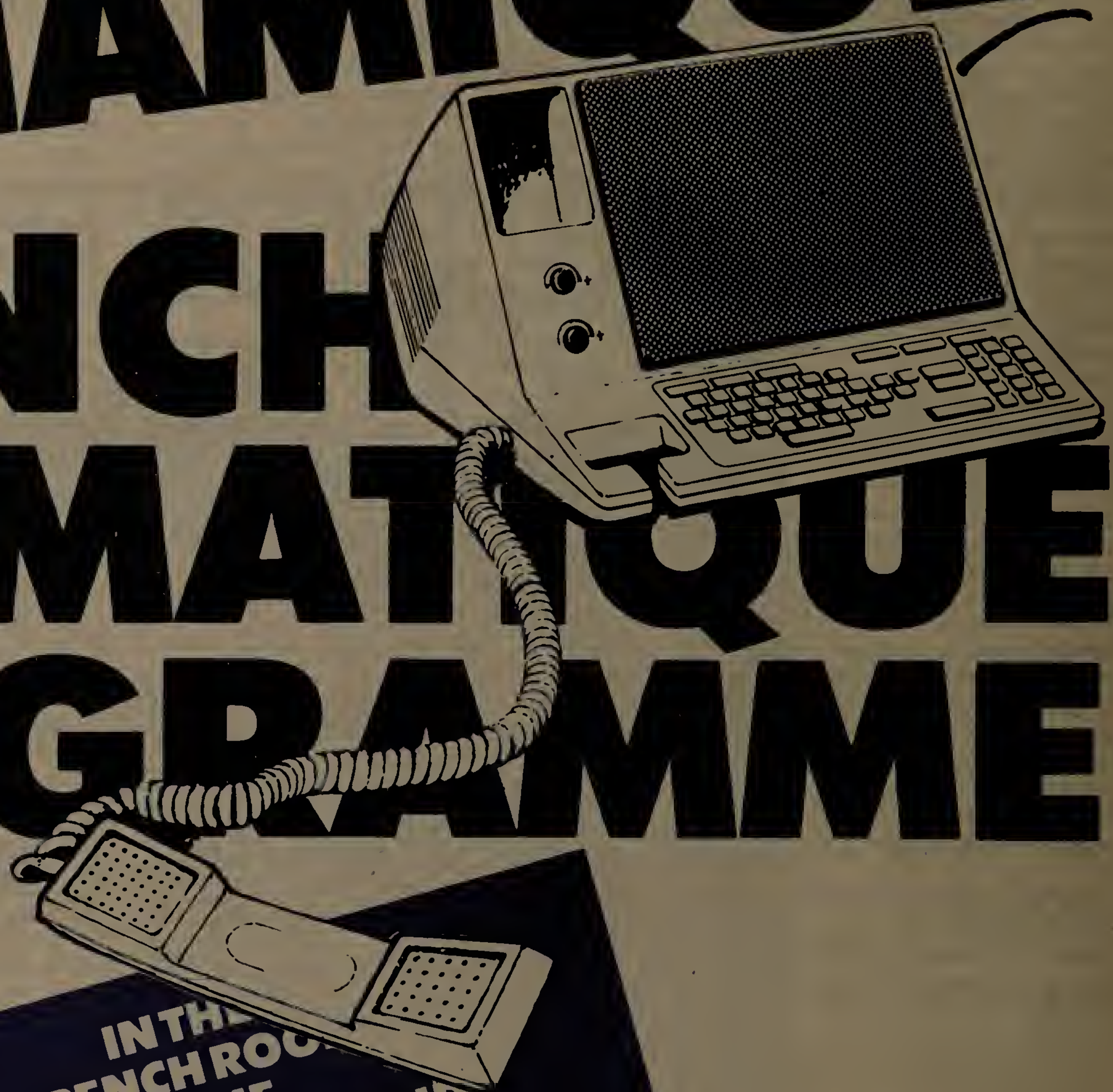

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Eliminates In-House Expense

Service Targets Credit Bureaus

GREENWICH, Conn. — A computer service offered by The Service Bureau Co. (SBC), a subsidiary of Control Data Corp. here, reportedly will give credit bureaus many of the functions and capabilities of their own computer system without the expense of going in-house.

Known as the Focus Intelligent Control Unit (ICU), the service consists of a CPU with a combination of CRT terminals and high-speed printers. It is used with an on-line, real-time processing system at SBC's center in Campbell, Calif.

The system provides for on-line processing of share and loan transactions and includes on-line inquiry displays, member-account history and general ledger. There also is a capability for report printing at the credit union.

Some of the features of Focus ICU include new on-line terminals; utilization of the workstation concept, which allows each teller to operate an individual CRT while sharing printer capabilities; expanded teller accounting with up to four separate accounting totals per CRT; cash drawer accounting by teller; consolidated audit trail; and increased password security.

Software maintenance will be provided by SBC's Campbell facility. Enhancements or revisions to programs will be delivered to the credit union via a telecommunications network.

The Focus ICU is priced between $45,000 and $50,000, from 500 W. Putnam Ave., Greenwich, Conn. 06830.

Free Brochures

- A brochure explaining how to buy and use remote computing services (RCS) is now available from Martin Marietta Data Systems. Data security, cost control, what to look for in a vendor and how to make the most effective use of RCS are some of the topics covered in the booklet. Copies are available from the vendor at 1601 Ivy Lane, Greenbelt, Md. 20770.
- An eight-page executive summary of the Info-Dyne, Inc. study on "Computer-Based Financial Analysis, Modeling and Business Planning — Languages and Packages" can be obtained from the vendor at 1700 W. 78th St., Minneapolis, Minn. 55423.
- A free microcomputer software catalog has recently been compiled for engineers and surveyors, with listings of pertinent programs and applications. The text is available from Microcomp through P.O. Box 965, Solana Beach, Calif. 92075.

Tips Aid Planners

(Continued from Page 49)

dates be met and that the first week of project implementation is considered equal in importance to the last.

Never accept the statement, "I know I'm behind now but it's a long project and I'll make it up before we can finish." Falling behind the schedule at the beginning of the project usually means additional resources required later.

12. The "cold feet" syndrome. As the implementation date draws near fight against the temptation to define the reasons why the due date can't be met. Instead, spend that time to determine what is required to ensure that the project is completed on schedule.

13. In-house expertise. Staff members should make a definite effort to develop product expertise and familiarity. Despite warranties, it can be difficult or impossible for the vendor to provide help at 2 a.m., particularly if his office is in a remote location.

14. Post-implementation. It is a sad fact that most conversions would never take place if the DP manager waited until his organization was ready for them. This implies that there will be a list of "clean-up" items after the conversion and implementation is accomplished. Attend to these items immediately and don't allow staff efforts to slack-off until all of them have been completed.

Sims is president of Sharing Information Management Service, a Sioux Falls, S.D., consulting firm that specializes in providing information to the life insurance industry.

Documentation System Backs Operations

ATLANTA — Leland Computer Services, Inc. has introduced the Automatic Documentation System (ADS), comprised of four facilities that interpret a job's Job Control Language (JCL) and optional input to produce a standardized set of operations documentation.

ADS also includes a JCL management facility, including standards enforcement; an on-line interaction with systems programmers, application programmers and operators; and a series of resource management and audit reports.

There is a disaster recovery backup of an installation's operations documentation. ADS operates in both batch and on-line modes (TSO is optional) against total systems or single programs in IBM or equivalent OS/VS1, OS/SVS or OS/MVS environments.

ADS can be licensed on a permanent basis for $12,000 from 669 West Paces Ferry Road, Atlanta, Ga. 30327.

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Level 6, DPS 6 Get Screen Editor

SANTA ANA, Calif. — A cursor-driven screen editor and formatter has been developed by California Software Products, Inc. (CSPI) to run on the Honeywell, Inc. Level 6 and DPS 6 computer systems.

The software package, called Theodore/Format, runs under the Gcos Mod 400 Version 2.0 and Mod 600 operating system, according to a vendor spokesman.

Theodore/Format is reportedly reentrant and sharable. The screen editor/formatter can be used with Honeywell's VIP 7200 and VIP 7800 terminals and the IBM 3101 terminal. Theodore/Format can be configured for other terminals, the vendor said.

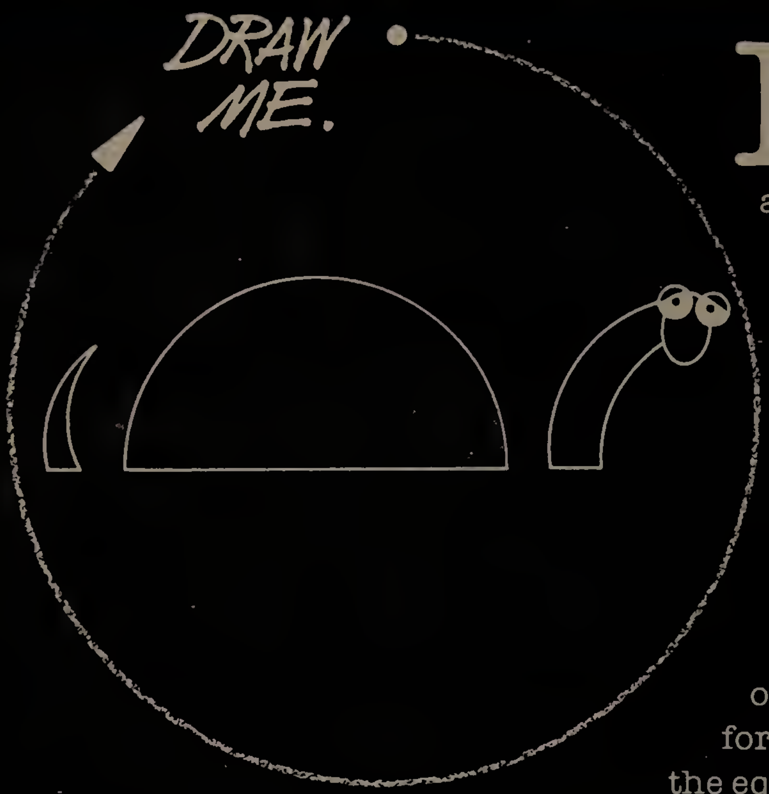
The video screen displays a 23-line window into the file being edited, with the 24th line being used for status, help information and error messages, the vendor said.

As new text is typed in or existing text is edited, the changes affect the contents of the window. Theodore/Format can be used to edit documents, programs and data files, the vendor said.

It uses a direct-access work file and is written in ISO Standard CSPI Pascal.

Theodore/Format is available in binary form only for a license fee of $5,000/CPU.

Software product support costs $600/year and the user manual, $10, from Suite 300, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.



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S'PRINTER doesn't require a programmer to compile the data.

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'Rabbit-1' Updated

WEST PALM BEACH, Fla. — Raxco, Inc. unveiled Version 3.0 of Rabbit-1, its resource accounting and billing system for Digital Equipment Corp. VAX/VMS users.

Major improvements include a new menu selection approach, more efficient processing and several options, the vendor said. The Menu enables the user to select from more than 10 categories of transactions to be affected.

Rabbit-1 options include a user budget system, program accounting system, communications post accounting system, project code accounting system, disk accounting system and report generator.

Rabbit-1 is written in Fortran IV and runs in VAX native mode. Rabbit-1 base price is $2,495. Options are available for $250 each. Rentals are $99/mo and $12.50/mo respectively.

The vendor is located at 3336 N. Flagler Drive, West Palm Beach, Fla. 33407.

Whelan Offers Mailing Lists For Series/1

SPRING HOUSE, Pa. — Whelan Associates, Inc. has announced a package for the IBM Series/1 processor that maintains a prospect mailing list.

Written in EDL, the package can be used by direct-mail firms, manufacturers, clubs and nonprofit organizations, the vendor said.

Features include both printing and inquiry of the mailing list on an entire or selective basis.

The package costs $3,000 from the firm at Gwynedd Plaza, A/E Center, P.O. Box 650, Spring House, Pa. 19477.

Package Handles Inventory Control

SIOUX FALLS, S.D. — A fixed-asset subledger and inventory control system with full documentation is available from Sharing Information Management Service.

The package features complete audit trail, inventory control reporting, subledger control and reconciliation.

The system carries a one-time lease fee of $2,500 from Sharing Information Management Service, 1609 E. 49 St., Sioux Falls, S.D. 57103.

Correction

The DL/1 data base generator that is part of Synergetics Corp.'s DOS Pro/Test [CW, April 20] is available separately for $8,400.

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Shown above are Burroughs 4 to 6 processor and 5 to 8 processor CP 9500 models with Burroughs terminals and printers for banking, manufacturing, hospital, and general purpose use.

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Burroughs CP 9500s offer four to eight independent processors to meet your particular needs.

Their unique multi-processor design lets applications, file management and data comm proceed simultaneously, while the CP 9500 Master Control processor allocates resources to changing work loads and reassigns jobs as processing continues.

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With the CP 9500, you can add processors, memory, terminals and peripherals as requirements grow — without changing a single application program. You gain access to Burroughs proven systems and applications software, recognized for ease of use and productivity. You can add new network functions or applications at any time while protecting your programming investment.

Burroughs CP 9500 systems start at under $25,000 — a small price to pay for real freedom of choice!

For information call Burroughs local office or toll free in the continental U.S. 800-521-4866. In Michigan, 800-482-2402. Or write to Burroughs Corporation, Dept. CW-8, Burroughs Place, Detroit, MI 48232.

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It has the power to handle 4 megabytes of memory, 1.9 billion characters of on-line disc storage, up to 96 terminals, 4 line printers, 7 synchronous datacomm lines and 8 mag tapes.

In five minutes, on-line users can access an IMAGE data base 1,560 times to enter or update orders. At the same time, the computer will respond to 51 inquiries into the data base, and generate formatted reports for all of them, with subtotals and totals. In the background, it can compile a 1200-line COBOL program 1.5 times. And read, sort and report a 9,000-record file twice. It will do all this while giving each on-line user a response in an average of 1.5 seconds!**

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The Series 44 continues the HP 3000 tradition of compatibility. So it will run the software developed for earlier models. Or for smaller members of the current family.

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It also has all those other HP 3000 features—including IMAGE data base management and forms management—that make our computer family so easy to use and program. And we've given it an enhanced operating system, MPE IV, to manage the increased memory and discs even more efficiently than previous versions.

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***Initially available in the U.S. only.

47102HPG67

Videotape Course Covers Software Engineering

FORT COLLINS, Colo. — A videotape software engineering course designed for those involved in the development or maintenance of software products is available from Colorado State University.

The software engineering course, 20 half-hour tapes, covers modern techniques of software analysis, design, coding, testing and maintenance while emphasizing the tools and notations that are useful on software design projects and application areas, the school said.

"Software Engineering" is priced at $5,355 or can be leased for $1,340 from Colorado State University, Engineering Renewal and Growth, Christman Field, Building 1000, Fort Collins, Colo. 80523.

For 'Data Center Starcom' Users

NCR Adds Printing Capability

DAYTON, Ohio — NCR Corp. announced that retailers using its Data Center Starcom software will now be able to print daily business reports on site, drawing on information they have stored in Data Center computer systems.

With the Remote Printing Module, users have the option of producing hard-copy daily operation reports using an NCR matrix printer located on site. A full range of accounts payable and sales analysis reports together with a general ledger listing can be printed on request, the vendor claimed.

The Remote Printing Module is priced at $5,075 for the printer and communications interface with a one-time installation charge of $125 to present users of the company's accounts payable software packages from NCR Corp., Dayton, Ohio 45479.

Modcomp Adds Viewdata To Classic Mini

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. (Modcomp) announced the availability of a software package that it claims can be combined with its Modcomp Classic minicomputer hardware to form a viewdata system.

Viewmax will run on Modcomp Classic under the vendor's Max IV operating system. A range of configurations up to 256 ports reportedly are available.

Viewmax software is available separately, priced from $40,000 to $60,000. Packaged in a complete system, it is priced from $120,000 with 16 ports to $250,000 for a system expandable to 128 ports.

The vendor may be reached through P.O. Box 6099, 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.

'Screen-Assist' Gains Printing

INDEPENDENCE, Mo. — Billings Computer Corp. has announced Print-Assist, a programming tool to format printed reports in a similar fashion as the Billings Screen-Assist package.

Both packages eliminate the need for specifying formatting instructions in the source code by allowing the programmer to specify a template with "fields" that are filled in with data, the firm said.

The Print-Assist package costs $400, Billings said from 81600 E. 37th Terrace S., Independence, Mo. 64057.

Report Aimed At Pascal Users

HAMDEN, Conn. — A newsletter directed specifically to users and prospective users of the Pascal programming language was announced here by Southwater Corp.

Called "Pascal Market Newsletter," the quarterly publication contains news about software, hardware and educational materials relevant to the Pascal language.

Subscriptions cost $8 in the U.S., Canada and Mexico, and $12 elsewhere. A $2 charge is made if invoicing is required.

Subscriptions may be ordered from "Pascal Market Newsletter," Southwater Corp., 2348 Whitney Ave., Hamden, Conn. 06518.

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WHEW!

Cincom Systems received 14 awards–more than any other software company–at the recent International Computer Programs (ICP) awards ceremony.

And for each and every one, we want to say thank you to our 4,000 customers worldwide. Because ICP awards are based on sales, and sales are based on your confidence in our products.

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Series 80 MANTIS. A major breakthrough in application development technology, MANTIS received the ICP Million-in-One Award for achieving $1 million in sales in its first year on the market. Remarkably, MANTIS achieved this record in only six weeks.

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Series 80 T-ASK on-line interactive query system.

Series 80 SOCRATES data extraction and report generation system.

Series 80 ENV-DATA on-line end-user data entry system.

At Cincom, we're proud of these awards. But we're prouder of what they mean–that Cincom products consistently measure up to your standards of excellence.

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And thirdly come the Streamers. These come with 25 IPS start/stop to 100 IPS streaming and 1600 BPI. This family is an extremely cost-effective back-up to Winchester disk drives.

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Tool Cuts Series/1 Order Entry Time

BURR RIDGE, Ill. — The Data Relay System (DRS), a package based on EDL operating on the IBM Series/1 minicomputer, has been announced here by Sweeney Computing Corp.

DRS/Order Entry reportedly reduces lead time to the three months necessary for customizing order entry systems to users' specific applications. The system involves installing an IBM Series/1 that answers incoming telephone lines dedicated to order-taking.

Based on information (validation files) supplied previously by the main computer, DRS/Order Entry receives, edits and stores incoming order information, the vendor said. This input is then available to the main computer for processing.

It can also function in a distributed network role wherein Series/1s are located in remote locations to collect, edit and forward local order information to a central computer facility, according to the vendor.

When an order is called in, DRS/Order Entry leads the caller through the order-taking process via a question and answer conversion. The order is verified for accuracy according to predefined specifications, according to the vendor.

The basic DRS/Order Entry system is priced at $25,000, with selected options available that can increase the price to $40,000, the vendor spokesman said. Sweeney Computing is headquartered at 60 Shore Drive, Burr Ridge, Ill. 60521.

Mortgage Brokers Get IBM-Based Accounting

SAN JOSE, Calif. — An accounting package for mortgage loan brokers which runs on the IBM 5110 and 5120 systems has been announced by Business Programmer Services, Inc.

The system provides for maintenance of lender and loan information, receipt of funds, trust account posting, automatic and individual disbursements and an array of functional documents and statistical reports, the company said.

Levels I, II

Level I of the package will run on a 32K-byte system with two disk drives and will support up to 600 loans and 600 lenders, the vendor said.

Level II of the package requires a 48K-byte system with two to four disk drives with increased capacity of up to 1,500 loans and 1,500 lenders, the company claimed.

The package is priced at $4,000 with installation extra from Business Programmer Services, Inc., 650 S. Winchester Blvd., San Jose, Calif. 95128.

Data Formatter Aids Reporting With VSAPL

ATLANTA — Interprocess Systems, Inc. here expanded its APL systems software offerings with a data formatter for all VSAPL environments.

The data formatter is called Enhanced Format and is an assembler language extension to the VSAPL interpreter.

It is said to permit formatting of APL data for reports by allowing the standard format operator to edit right-hand argument APL data expressions according to format controls specified in a character vector left-hand argument.

Single List

The vendor said Enhanced Format enables an APL programmer to combine character and numeric data items in a single right-hand argument list structure.

The product is targeted at current or prospective APL users who find the APL formatting inadequate for producing reports and users of APL function-level formatters who are seeking a more CPU-efficient means of formatting data, the vendor said.

Time-sharing customers who need a Quad-FMT equivalent to move their APL applications in-house and time-sharing companies who need to improve their APL capabilities are also targets, Interprocess Systems said.

The perpetual license fee for Enhanced Format is $5,000, including a 30-day testing period and the first year of maintenance, the vendor said from Suite 608, 6065 Roswell Road, N.E., Atlanta, Ga. 30328.

Tool Runs Accounting On DEC

ALBUQUERQUE, N.M. — Prodata has released a Multi-Journal Accounting (MJA) system that it said is compatible with all Digital Equipment Corp. operating systems (OS8/78, Basic, RT11, RSTS, RSX and VMS) as well as with any Western Digital, Inc. CP/M-based operating system utilizing Microsoft, Inc's. MBasic.

MJA is the first accounting software to bridge the micro-DEC gap and the first to offer single-source training and documentation for all DEC hardware, Prodata claimed.

MJA is a fully integrated accounting system consisting of five modules: general ledger, accounts receivable, accounts payable, payroll and order entry/inventory. Modules may be purchased individually or as a package.

The system provides such reports as sales journal, cash receipts/disbursements and purchase journals. Prices range from $4,000 to $5,000 per system ($850 to $1,050 per module) according to the configuration ordered.

Prodata is at 509 Spruce St. S.E., Albuquerque, N.M. 87106.

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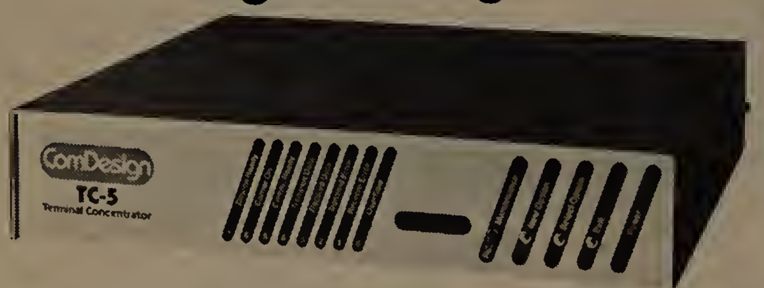

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Codex Head Probes Issues

Standards Give Rise to Debate, Headache

By Art Carr
Special to CW

When it comes to communications standards, we can probably agree on at least one thing: they make for some interesting debates in philosophy and some royal headaches in reality.

When we speak of standards there is usually a substantial gap between the idea and the reality, and it is often up to us — the user and the manufacturer — to bridge this gap and make standards a workable, beneficial reality.

This requires two things: applying our very real experience to the formulation of standards; and exercising an understanding of the nature of the environment onto which we wish to impose standards.

That means we must ask:

- Are there any preexisting standards in force, and if so, will our activities make things better or worse?
- Will the creation of a standard stimulate the growth of a market or inhibit innovation in an existing market?
- Is a standard being promulgated to protect a monopoly or stimulate competition?

Setting Standards

Formulating standards is often a political/economic event rather than simply a technical exercise.

There are at least five different kinds of standards. There are hardware standards — like those for electrical interfaces and buses — and transmission facility standards, like tariff and Consultative Committee on International Telephone and Telegraph (CCITT) recommendations that describe transmission media characteristics.

There are software standards — like the Synchronous Data Link Control and binary synchronous (bisync) protocols — and what we might call "networking environment" standards — such as IBM's Systems Network Architecture and Digital Equipment Corp.'s Decnet.

"That dog won't hunt," a congressman once said of an idea Codex Corp. President Art Carr had for regulation of AT&T. Still, Carr has been influential in development of data communications standards and, in this article (extracted from a recent speech), he says what he thinks of standards already out or on their way.

Finally, there are the regulatory standards like the Federal Communications Commission's (FCC) Part 15 or Part 68.

We can agree on formal standards in those five areas; but we can also have de facto standards imposed by manufacturers or carriers that make matters twice as complicated.

For all this we know bisync comes in different versions, so two so-called bisync terminals may be plugged together and still be unable to communicate. Implementation of formal or de facto standards can thus make matters more complicated still.

I would certainly regard the attempt to replace the RS-232 communications interface with RS-499 as standards-making at its worst. The attempted amendment of a widely accepted and in-use standard causes more problems than it solves and could inhibit innovation.

Then there is the FCC's Part 68 standard that specifies methods of interconnecting customer-provided terminal equipment with the Bell public network. This would be a classic example of elaborate standards-making activity undertaken for no real reason. FCC produced unnecessary, costly and inhibiting standards to protect a network that was never really threatened.

As for the CCITT's V.29 standard for 9,600 bit/sec modems, I consider this to be standards-making very nearly at its best. Here, an international forum consisting of manufacturers, users and national postal, telephone and telegraph (PTT) monopolies was able to formulate a standard in the face of a pressing need — a standard that has been widely and successfully adopted throughout the world.

Regarding emerging standards for local networking and distribution, I would say there has been significant progress over the past year or so in garnering support for local distribution technologies and protocols. Two useful but contradictory standards — Ethernet and token passing — will, in my opinion, peacefully coexist.

This area of standards-making is going so well because of the active participation of interested groups with a stake in local networking's future, the absence of a prior standard, timely consideration for benefits of such standards and the flexibility they seem likely to have.

Carr is president of Codex Corp. and vice-president of its holding company, Motorola, Inc.

Data Briefs

Plessey Offers Unit For 3002-Type Lines

GAITHERSBURG, Md. — A modem said to operate at 16K bit/sec over Bell Laboratories-type 3002, C4-conditioned leased telephone lines has been announced by Plessey Microsystems, Inc.

The 16002 modem is suited for long-distance communication lines and features forward error correction, which permits operation over noisy lines at a reduced rate, the firm said.

The 16002 Modem is priced at $14,500 from Plessey Microsystems, 19546 Clubhouse Road, Gaithersburg, Md. 20760.

Develcon Modem Out For Short Distances

DOYLESTOWN, Pa. — Develcon Electronics, Inc. has unveiled a synchronous modem that operates up to six miles at selectable speeds from 1,200 bit/sec to 19.2K bit/sec.

The Model DS5457 may be used in full- or half-duplex or multidrop configurations and is RS-232C-compatible.

The modem costs $425 from Develcon at 200 North St., Doylestown, Pa. 18901.

Switch Device Gives Modem, CPU Sharing

SANTA ANA, Calif. — A code-activated switching device said to allow one to four RS-232 terminals to connect and share one modem or CPU has been announced by Western Telematic, Inc.

The self-powered CAS-41 operates from 110- to 19.2K bit/sec and is priced at $395 with quantity discounts from Western Telematic, Inc., 2435 S. Anne St., Santa Ana, Calif. 92704.

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Electronic Switching Gear Aimed at Publishing Mart

EUGENE, Ore. — Crosspoint Systems, Inc. has announced a line of electronic switching equipment designed to handle terminal-to-processor connections for hardware used in the publishing industry.

The switching system was originally designed to interface with Digital Equipment Corp's DH11-AA serial line multiplexer. It is also compatible with hardware designed by other manufacturers, the vendor said.

Features reportedly include the ability to reconnect terminals and printers as quickly as necessary. The system also helps eliminate switching noise, contact bounce and momentary cross-connections, including patch panels, switches or relays, according to the vendor. The SD 150 multiplexer trunk switch's primary function is to take groups of terminals to a backup processor or to switch the complete terminal loads of two DEC processors.

A single trunk switch can be populated with up to eight dual switch boards, each capable of cross-connecting two multiplexers. It also allows all 16 serial lines of the DH11 to be switched with an alternate multiplexer, the vendor said.

The SD 250 terminal line switch has similar functions, but can be connected to two DEC DH11 multiplexers.

It reportedly will switch each of the 16 lines in the multiplexer and is capable of switching 32 terminals between two processors. Switching can be done individually or in bulk.

The 250 can be used for systems with existing distribution panels (20 mAcurrent or RS-232C circuits) or with its own panel, according to a spokesman.

The SD 150, designed for two multiplexers, costs $2,900. Additional switch boards cost $750 and the full 16 multiplexer unit costs $7,800.

The SD 250 costs $2,100 or $9,600 with 32 distribution lines from the vendor at 72 Centennial Loop, Eugene, Ore. 97401.

Videodata Broadband System Gains RF Serial Modem Series

ST. PAUL, Minn. — An RF serial data acquisition and control modem series has been introduced by Interactive Systems/3M as an addition to its Videodata broadband communications system.

The Model 720 Series modems — available in five models — are reportedly designed for low-cost communication of control data or acquisition of data from widely separated points in a facility.

Each modem communicates over the coaxial cable network through a Model 921 head-end modem to a serial port on the host processor. Communications format can be either RS-232C or current loop. Data transmission is full-duplex at 1,200 bit/sec.

The five models feature various I/O configurations including 16-bit input, 16-bit output, digital counters and analog/digital conversion.

Prices for the units begin at $1,200.

The firm can be reached at P.O. Box 33600, St. Paul, Minn. 55133.

Stand-Alone Digitizer Offered

ROCKVILLE, Md. — GTCO Corp. has announced the Micro-Pad, a stand-alone intelligent digitizer system.

The unit features an 8080-based microcomputer built into a compact desktop tablet. The 11in. by 11in. Micro Demi-Pad and the 11in. by 17in. Micro Digi-Pad reportedly do the job of the host computer at a fraction of the cost. Applications include strip chart analysis, medical data analysis, map and land planning, image analysis, NC machine programming and other uses.

Micro-Pad includes dual RS-232C interfaces and 16-button cursor or stylus. Options include a teletypewriter interface, power supply, CRT terminal, printer, minifloppy disk, mag tape cartridge and a user-programmable terminal, the vendor said.

The Micro Demi-Pad costs $3,080 and the Micro Digi-Pad costs $3,565 the vendor said from 1055 First St., Rockville, Md. 20850.

Miniterm Boasts 32-Char. LED

BURLINGTON, Mass. — Computer Devices, Inc. (CDI) has announced an enhanced version of its Miniterm Model 1206/PAT portable terminal featuring a 32-char. LED display.

The LED can be used for instructional prompting, order entry or other question/answer sequences. The Programmed Application Terminal (PAT) display option includes horizontal scrolling and a blinking cursor.

The basic 1206/PAT unit costs $4,585. The PAT display option, available early in the third quarter, costs $500.

CDI is located at 25 North Ave., Burlington, Mass. 01803.

Analyzer Measures Bit Errors

YORKTOWN HEIGHTS, N.Y. — A 25-oz. digital transmission analyzer designed to measure bit errors, total test seconds and errored seconds is available from AQ Systems, Inc.

The DTA-181 also measures elapsed time between transitions on any signal and/or control leads, such as RTS-CTS delay, pulse width and satellite delay. The analyzer costs $750 from AQ Systems at 1736 Front St., Yorktown Heights, N.Y. 10598.

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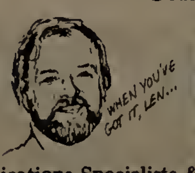
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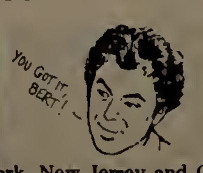
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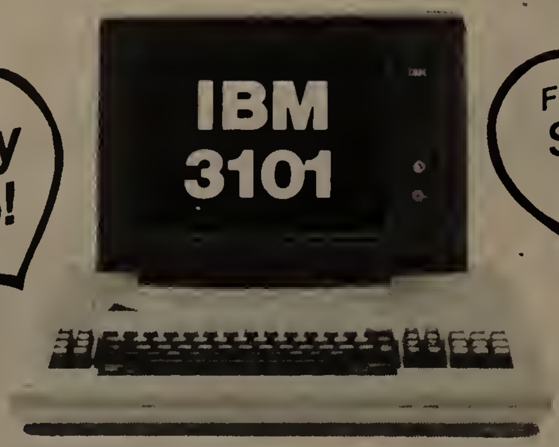

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INFORMATION ENGINEERING

By Clive Finkelstein

Part 2: Developing A Corporate Data Model Through Information Engineering

This is the second of six articles on information engineering, a planning methodology for developing corporate data models. It is intended for users and management with no computer experience. Information engineering provides formal DP methodologies for data analysis, data base design and synthesis of program specifications.

The articles cover the following topics: (1) information engineering methodologies, (2) developing a corporate data model, (3) information analysis, (4) data analysis and data base design, (5) procedure formation and (6) information engineering development.

As data processing has matured, we have realized that we must address the information needs of the organization better, both now and into the future.

While current needs can be determined by examining the existing systems in an organization, future needs are far more difficult. But unless future information requirements are anticipated and allowed for, the automated systems we develop today can end up in chaos.

A conference on Long-Range Planning for Information Systems, held in 1974 at the University of California at Los Angeles (UCLA) Graduate School of Management, brought together the directors of long-range DP planning at a number of large organizations (with revenues of more than $1 billion and annual DP budgets larger than $15 million). The results of this conference and papers from the conference were published in *Strategic Planning for MIS* by Ephriam R. McLean and John V. Soden (John Wiley and Sons, New York, 1977).

Limited Involvement

This conference included organizations that had been using long-range DP planning approaches for at least three years and documented their initial experience.

McLean and Soden indicated that the "MIS group generally participated quite heavily in the planning effort." However, there was "somewhat less involvement by users and even less on the part of top management." They went on to say that "the MIS planning activities were not closely tied to the strategy of the overall corporation."

A body of experience has built up through these early efforts. While long-range planning can be carried out by the DP function of an organization in isolation (not directly involving users and managers), such planning may not achieve its objective. For unless the long-range plan reflects the strategic direction of the organization, future changes may not be factored into the DP plan.

Information engineering builds on this early experience. It provides methodologies that can be applied directly by users and management themselves, with support by DP personnel in project management and data recording.

The **information** analysis component of information engineering is based directly on corporate planning techniques and applies those techniques to identify the corporate data resource used through all levels of the organization. (Later methodologies provide for formal implementation of that corporate data model.)

Information analysis provides feedback, which enables the corporate strategic direction to be evaluated and further refined. For example, measurement criteria can be established for evaluation of performance against established objectives.

Procedure formation further leads to formal derivation of procedures based on the corporate data model. These new procedures are objectives-driven. New business opportunities are suggested, which support the objectives and provide further feedback to refine the strategic direction.

Procedure formation and information analysis, used together, provide formal methodologies for development of **decision support systems.**

The corporate data model, to be ef-

(Continued on In Depth/2)

(Continued from In Depth/1)

fective, *must* reflect the organization's strategic direction. Information engineering helps establish that direction, through **strategic requirements planning.** The rest of this article introduces some of the concepts of this information engineering methodology.

Strategic Requirements Planning

Corporate planning establishes the importance of corporate objectives as the basis for formulating strategic plans. The organization's current situation, with its present products, markets and channels, is assumed.

However, this is not sufficient for our purpose. We need to gain a fundamental understanding of the organization as it exists in order to identify that data which is essential for its functioning — which in effect "mirrors" the organization today — and can be used to measure its progress.

To establish this basic foundation, we must first examine the prime objective of an organization: its purpose and mission.

The purpose of an organization may seem obvious — so obvious that it may be assumed and not defined. For example, the purpose of a university is to educate. The purpose of a retail organization is to purchase or manufacture goods for resale to the public.

Peter Drucker, in his book, *Management* (Harper and Row, New York, 1973), insisted that by defining the purpose and mission, top management answers the three most important questions that establish the reason for the organization's existence now and the direction it may take in the future. Drucker identified these essential questions as: What is our business? What will our business be? What should our business be?

An organization that functions without a defined purpose and mission drifts like a boat without a rudder. It is not master of its own destiny, has no direction and no reason — and it is blown along by the winds of change. In time, it will fail, because it will become subject to events that will run counter to its true purpose. But these events are not recognized as dangerous until a point at which no amount of management skill can save the organization.

The purpose and mission statement describes the organization as it is now ("What is our business?"). It also identifies the direction the organization is heading ("What will our business be?") — and the direction it *should* be heading ("What should our business be?"). By defining the purpose and mission, a broad overview of the organization now — and what it will be in the future — can be determined.

For the Future

In developing an information system, we are embarking upon development activity that may take months or years to complete. But we focus our attention only on what the business is now and then automate that understanding over a period of perhaps one or two years. The information system thus reflects the organization as it was one or two years ago — not as it should be at the time development is completed.

Top management has the responsibility for defining the purpose and mission of the organization and determining the organization's "customers" and their needs. Strategic requirements planning assists this process. Information analysis and procedure formation provide feedback that allows evaluation and refinement of the strategic direction.

Mission of Business Units

The various operating units, or business units, must also have an established purpose and mission. Information analysis and procedure formation can be applied to individual business units (or an entire corporation) to determine "what our business *should* be."

Let us now examine the factors that determine the organizational structure — the products (or services), markets and channels. By examining them, we identify in detail how the organization goes about achieving its prime objective: to create a customer. From this, an organization establishes its structure.

This examination progresses to greater levels of detail than can be

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deduced merely from the purpose and mission. It focuses on the products or services the organization offers and the market for those products and services. It focuses on the channels used to deliver the products and services to the market.

Strategic requirements planning emphasizes not only the current products and markets, but also attempts to identify future products and markets. To plan for the future, various alternatives must be evaluated. Their market potential must be determined and the cost of future products identified.

This examination focuses on effectiveness and opportunities presented by existing products and new markets, new products and existing markets, and new products and new markets. Similarly, for service institutions this examination focuses on potential future services and the likely markets for those services.

Thus an identification of the purpose and mission of an organization and its business units — and of its products, services, markets and channels — provides essential insight into the organization as it is now and projected as far as possible to what it may be in the future.

This self-examination often requires a catalyst — generally someone external to the organization — to ask the searching questions (during strategic requirements planning) that must be answered to break away from today and consider the possibilities for the future. Such a strategic planning environment may put into question many of the things done today, since it requires justification based on their contribution to the prime objective: the purpose and mission.

Feedback for Planning

Organizations that have not previously introduced corporate planning techniques can use the information engineering methodology of strategic requirements planning to provide them with such a discipline (see Figure 1). It helps set strategic directions and establishes the corporate strategic statements that formalize that direction.

Information requirements planning then uses the established direction to identify profitability and productivity opportunities. It establishes priorities and information needs for subsequent information analysis.

Information analysis identifies and consolidates that data essential to support the information needs. It quality-tests the resultant data model against the strategic direction and provides essential feedback to refine that direction.

Procedure formation formally derives the procedures essential for creation, maintenance and use of the data essential to support management information needs. It provides further feedback to evaluate and refine the strategic direction. This direction is reflected in corporate objectives, business unit objectives and management objectives — which define the controls and measures to ensure achievement of the strategic direction.

Corporate Objectives

Corporate objectives are fundamental to the proper management of an organization, both now and in the future. They help determine the future. Management establishes strategies and activities (procedures) to ensure their achievement. The achievement of objectives is measured by information that provides feedback to management. This feedback is sometimes referred to as "controls."

Objectives are not abstract. They must be actionable and measurable.

Objectives must "degenerate into work." They are based on expectations, and the work and activities derived from objectives are intended to ensure the achievement of the objectives. But the mere setting of objectives in itself is no guarantee of their achievement.

Objectives are like a road map; they provide guidance as the organization moves into the future. However, while we may use a road map to plot a course toward a known destination, an organization may not necessarily know its exact destination.

A requirement to be profitable is not a destination; it is part of the journey itself. Being profitable ensures the continuation of the journey — the survival of the organization — but it is not an end in itself. Survival may depend on how profitable, so this measure should be indicated.

Management can use objectives to manage the progress of the organization. But objectives and priorities will change as management sets directions for the future. Objectives will also change as different people assume the responsibilities of a particular management function in the course of personnel reassignment.

Changed Objectives

When objectives change, those changes are reflected in new strategies for their achievement. Because objectives are actionable and degenerate into work, those changed strategies may require a change in activities: the procedures established in the organization.

Changes in procedures may represent significant change to the organization. But change it must, if it is to be able to maintain the direction set by the new objectives or priorities. There may be no alternative to such procedural change; some changes may be essential for survival.

Procedural change may involve a difficult period of transition. This transition period requires significant adjustment in the organization, in its present manual systems and also automated applications. But while such change may be difficult for manual systems, it can be catastroph-

(Continued on In Depth/4)

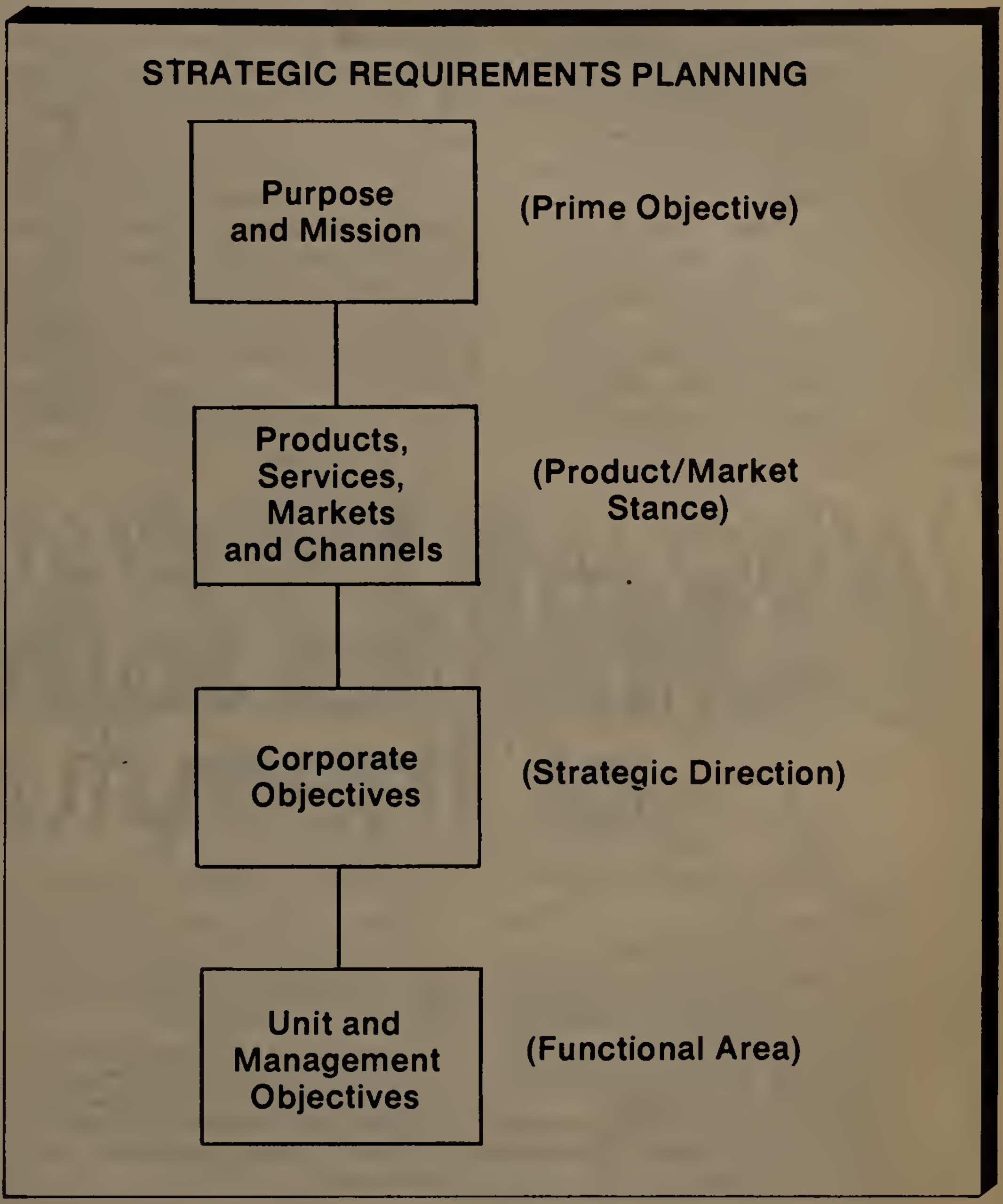

Figure 1

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(Continued from In Depth/3)

ic for automated systems.

The automated application systems we have developed in the past have been based (invariably) on the procedures that existed at the time of initial design. These procedures reflected earlier objectives and strategies. They may not necessarily be appropriate to the future.

Our automated application systems are constrained in their ability to change. We are at the same stage in application development and maintenance techniques as the automobile industry was in the 1900s. Each application is hand-built. If documented properly, it may be capable of being maintained (changed) by people other than the original builders. But with the pressure of deadlines, documentation often suffers, with the result that change may be quite difficult and in some cases impossible.

Even more serious than the quality of documentation is the way in which those systems were developed in the first place. Present application development techniques reflect the physical implementation of the application on the computer. Programmers need a detailed knowledge of the physical organization of files and the detailed content of records making up those files.

Data base technology has helped reduce this physical data dependence of programs. But we have tended to use data base management systems (DBMS) merely as sophisticated access methods. We have severely limited our ability to achieve data independence — the ability to separate programs from physical consideration of the way in which data is stored and organized.

Our automated application systems are often monolithic and incapable of anything but the most minor change. Even such minor change may cascade into a major system modification. The extension of a single field by a few digits or the addition of new fields to a present record may bring about only minor changes in each program. However, this change must be reflected in every program that references those fields. And if the organization does not presently use a data dictionary, it may be necessary to examine every program to determine those that must change.

Thus, once we have automated the existing procedures in an organization and implemented them as computer applications, we have effectively set those procedures in concrete! We are unable to change our application systems easily. Even a minor change may involve years of effort.

Any Answers?

So what is the answer? What is the cause of this inflexibility? Can we do anything to reduce it now and in the future?

The inflexibility stems from the emphasis we have placed on the permanence of existing systems or procedures. We have taken a procedure-oriented analysis and design approach in the past. It is this procedure-oriented approach — more than anything else — that has built inflexibility into our automated systems.

Procedures do change, but the basic data the organization uses does not change as much. We have a good understanding, even now, of the data we may need in 10 years' time. What we don't know is how we may need to use it then — how we may process it.

This has been found only through long experience. Organizations that in the past have taken an initial data-oriented approach to defining the data resource (and then used a procedure-oriented approach to automate appropriate procedures) have found they are able to accommodate change more readily than organizations that used only a procedure-oriented approach. The use of a procedure-oriented analysis and design approach alone results in programs that are unable to change readily when those procedures change.

Information engineering uses initial data-oriented techniques (information analysis and data modeling in data analysis) to define and structure the data that *is* the organization. Subsequent procedure-oriented techniques (procedure formation and

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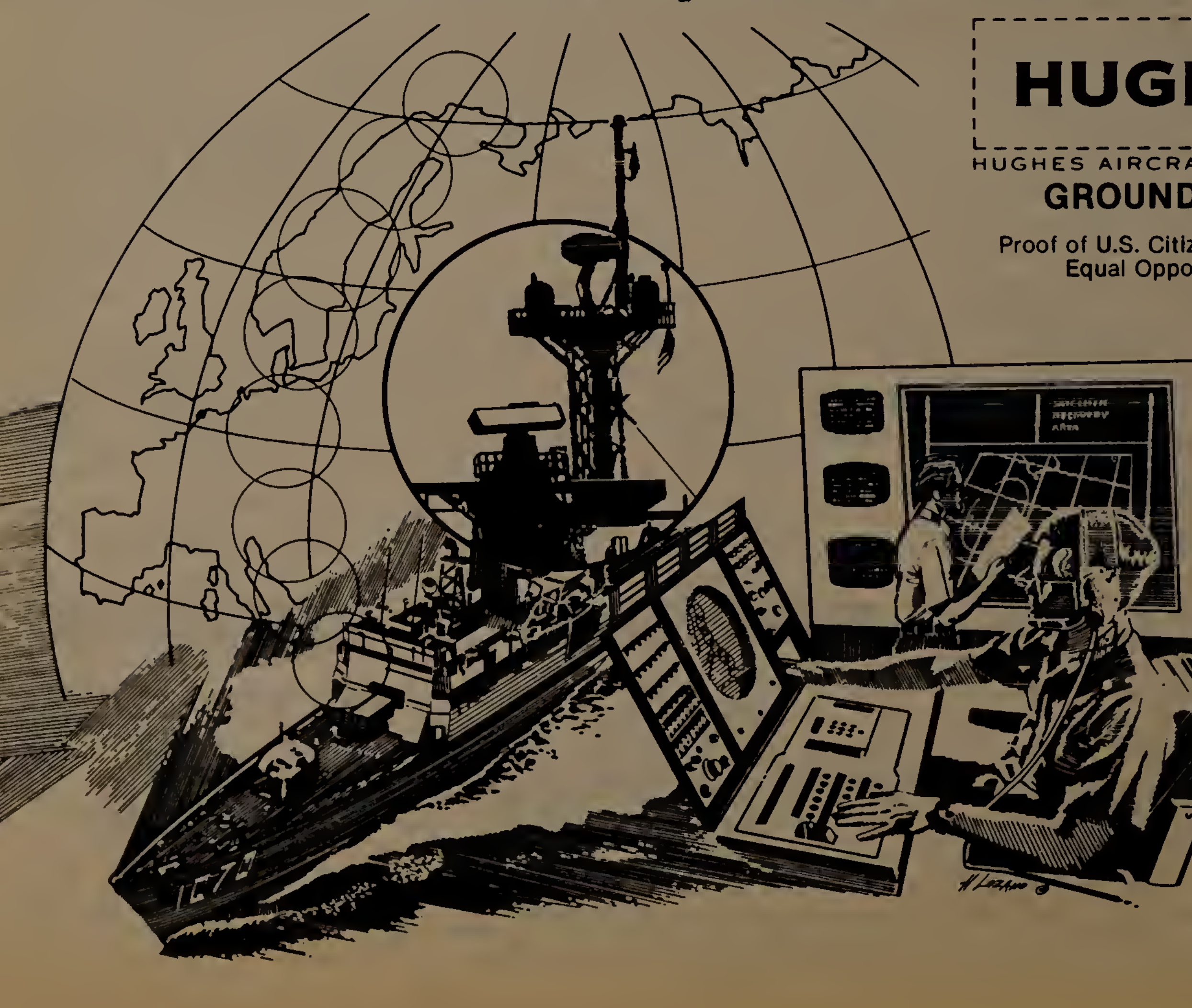

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also process modeling in data analysis) examine and determine the optimum processing of that data.

Unit Objectives

When we base our information systems on a more detailed understanding of the data that is relevant to the organization, those systems are better able to accommodate future change. By identifying the data resource (from an examination of the purpose and mission of the organization and its products, markets and channels) we can identify that data which is fundamental to the organization now and likely to be important in the future). And the direction established for the future is most readily determined from an examination of corporate objectives and strategies.

Corporate objectives are reflected in unit objectives for different operating business units throughout the organization. These unit objectives lead to management objectives. Management objectives can be used to establish information needs for decision-making through all management levels. This establishes further data in the corporate data model.

We often fail to identify adequately the information needs and contribution of individual managers. This leads to the manager's complaint that "the computer doesn't give me what I need." We have not been able to involve the manager directly in defining his information needs. We have had to interpret those needs on his behalf. Information engineering enables him to define those needs himself — far more effectively than DP analysts can.

We have seen that it is through changes in objectives that procedures change. If we are able to identify objectives and their measurement, we are then able to incorporate in the systems we design that data necessary to measure achievement of objectives. We can therefore more readily accommodate future change.

The nature and timing of the change may not be known with absolute certainty. But the likely ways in which change may occur can at least be deduced from an examination of the various objectives. We may not be able to design into our systems an ability to accommodate all future changes. Some changes will fundamentally alter parts of the organization — its manual systems as well as its automated systems. But from an identification of data through examination of objectives, we can at least minimize the impact of organizational changes on our automated systems.

Once objectives have been identified, we can ensure that the information systems of the future take these objectives into account and identify data relevant to those objectives. Those objectives enable us to see

(Continued on In Depth/6)

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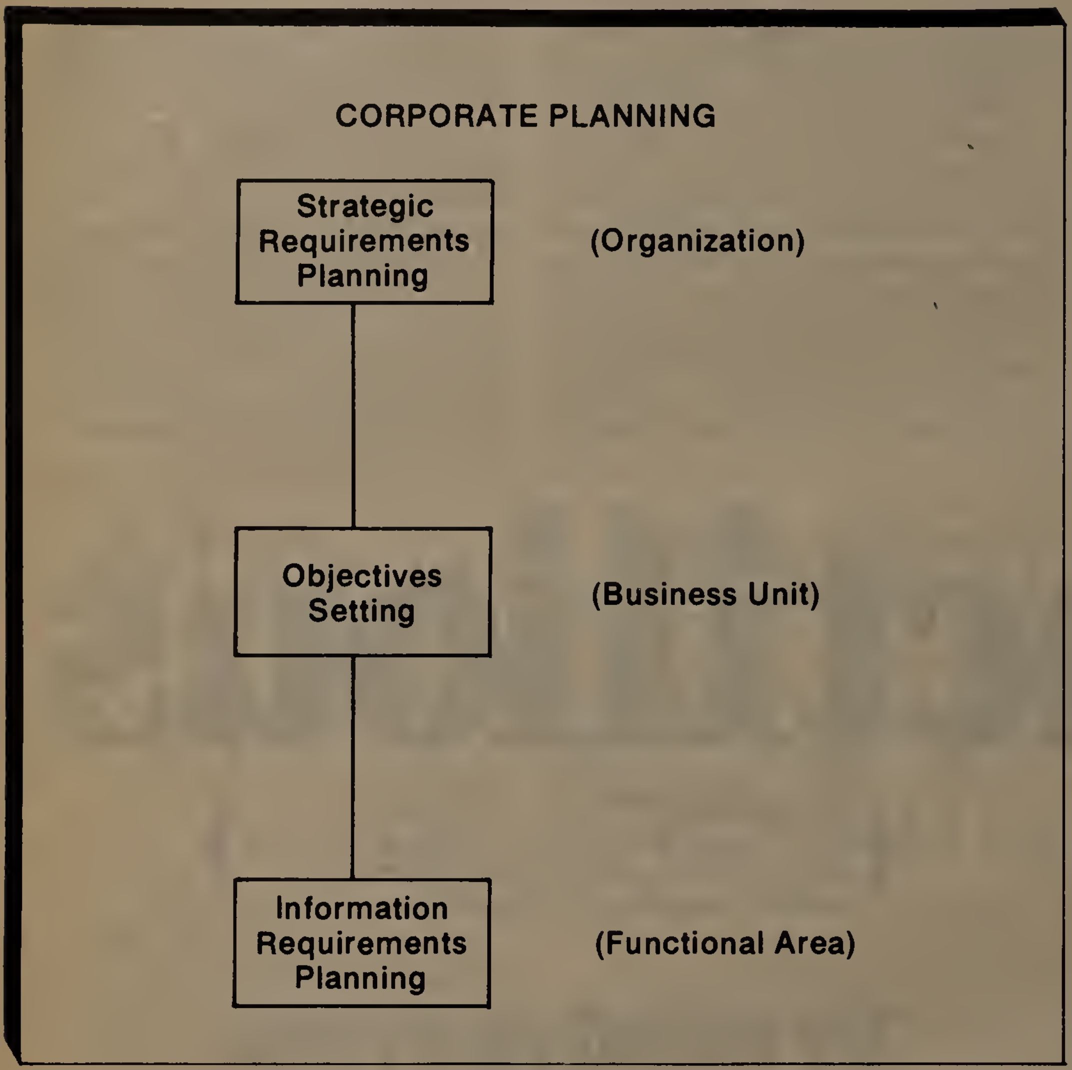

Figure 2

(Continued from In Depth/5)

some of the future change alternatives and determine management priorities. And those objective priorities help us determine not only current important objectives, but possible future significant objectives.

By ignoring the reality of change (because it cannot be predicted with certainty), many organizations have seriously restricted the useful life of their information systems.

We must produce systems which are more responsive to change.

Strategic Planning in Context

Figure 2 illustrates the corporate planning components of information engineering: strategic requirements planning and information requirements planning. We have seen the importance of objectives in achieving the directions established for the future. The figure illustrates objectives setting as an intermediate step between strategic requirements planning, which sets the direction, and information requirements planning, which identifies productivity and profitability potentials and establishes priorities for information analysis.

The corporate strategic statements help identify possible future change. The examination and interpretation of those statements is carried out during information requirements planning and then during information analysis and procedure formation. These techniques define and structure the corporate data model, based on the direction and statements established by strategic requirements planning. They provide feedback for evaluation and refinement of clear, actionable and measurable objectives.

Corporate Data Model

Information analysis is based on the premise that to understand and identify the data relevant to an organization requires an understanding of that organization itself. Such an understanding is derived from a basic examination of the organization's purpose and mission, as has been explained. Detailed understanding comes from the examination of the products, services, markets and channels.

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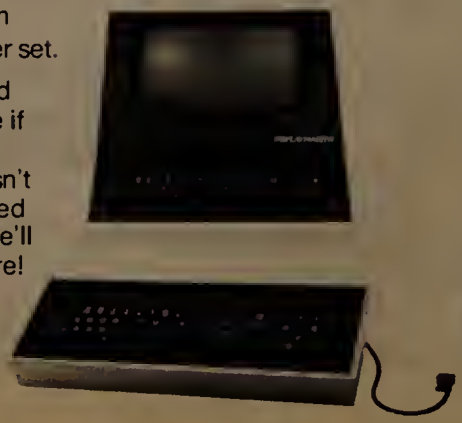

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nization," whether we are talking of the business or institution as a whole, or instead only part of that business or institution such as a division, branch, department or function. Information analysis can be applied at any of these levels.

As an organization grows and people are allocated to functional areas of responsibility, they are also allocated that subset of data relevant to their function. However, top management requires consolidated and summarized data for decision-making. Recognizing this, information analysis takes a top-down approach. It identifies first that data which is most stable and least able to change. It identifies last that data which is most vulnerable to change.

Discovery, Consolidation

Information analysis progresses through two main phases: information discovery and data consolidation. These are illustrated in Figures 3 and 4 respectively. The stages within these phases are introduced in the following paragraphs.

Stage 1: Initial Data Identification. This stage examines the purpose and mission of the organization. This is its most stable aspect. It changes only when there is a fundamental change in the type of business it conducts. For example, the purpose and mission of a bank is to accept money from depositors (individuals, companies or institutions) and make it available to borrowers.

Provided the organization remains in the same basic business area, certain fundamental data will always apply. However, if the purpose and mission change (such as when a bank moves into building construction, or a hospital moves into banking, or an insurance company moves into manufacturing), the whole nature of the organization changes. Its data and procedures, whether they be manual or automated, fundamentally change.

An identification of the purpose and mission establishes a broad understanding of the organization and the data fundamental to its existence. It requires top management involvement. Only top management has the knowledge and insight that permit a succinct definition and interpretation of the purpose and mission.

From that management purpose and mission perspective (and by subsequent interview or management participation), a broad corporate view of the data subjects (customers, orders, accounts, policies, products and so on) can be obtained. This is documented in a subject list.

Stage 2: Functional Area Data Modeling. This stage then proceeds to an examination of the products, services, markets and channels of the organization.

(Continued on In Depth/8)

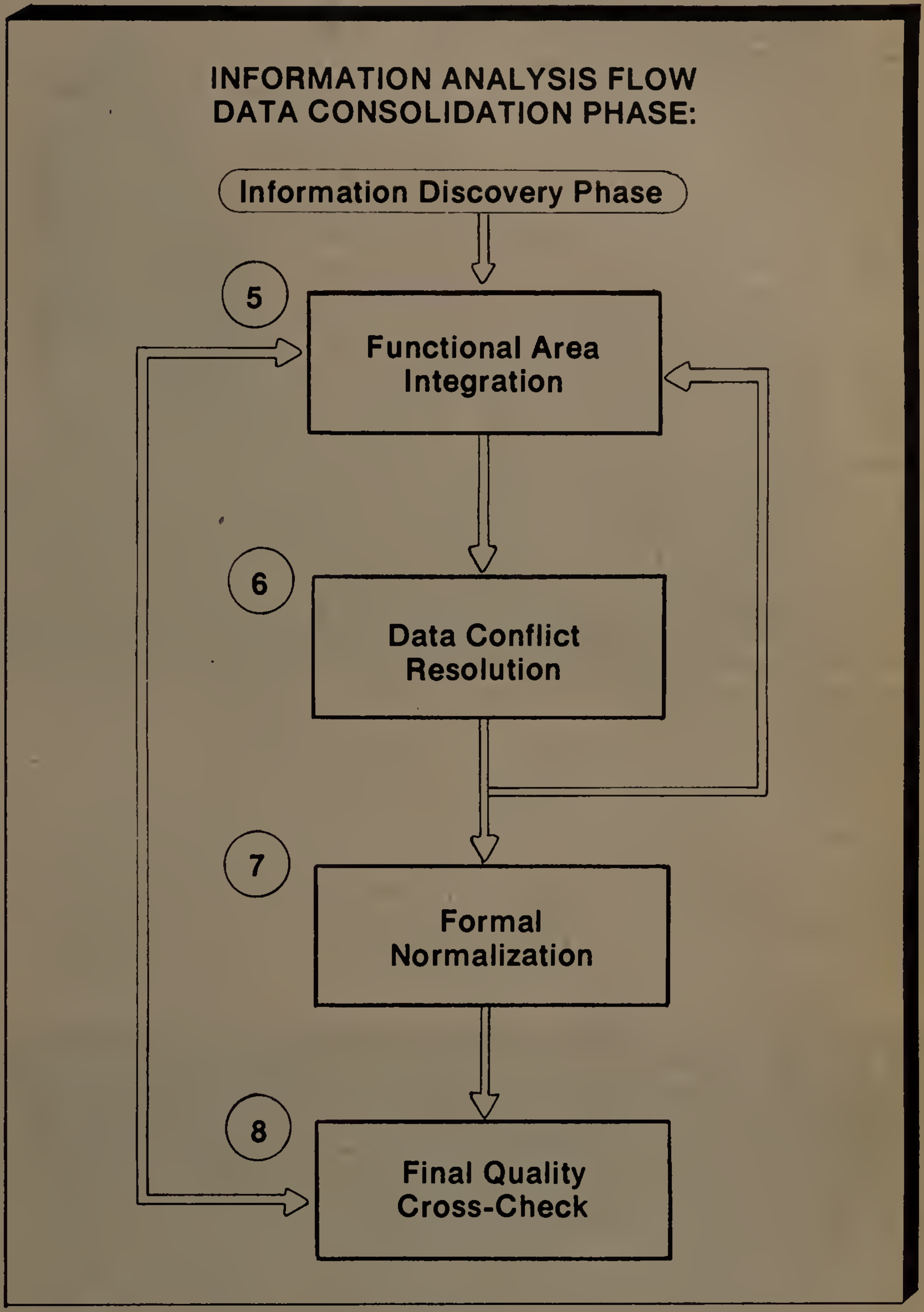
INFORMATION ANALYSIS FLOW
DATA CONSOLIDATION PHASE:
Information Discovery Phase
5
Functional Area Integration
6
Data Conflict Resolution
7
Formal Normalization
8
Final Quality Cross-Check

Figure 4

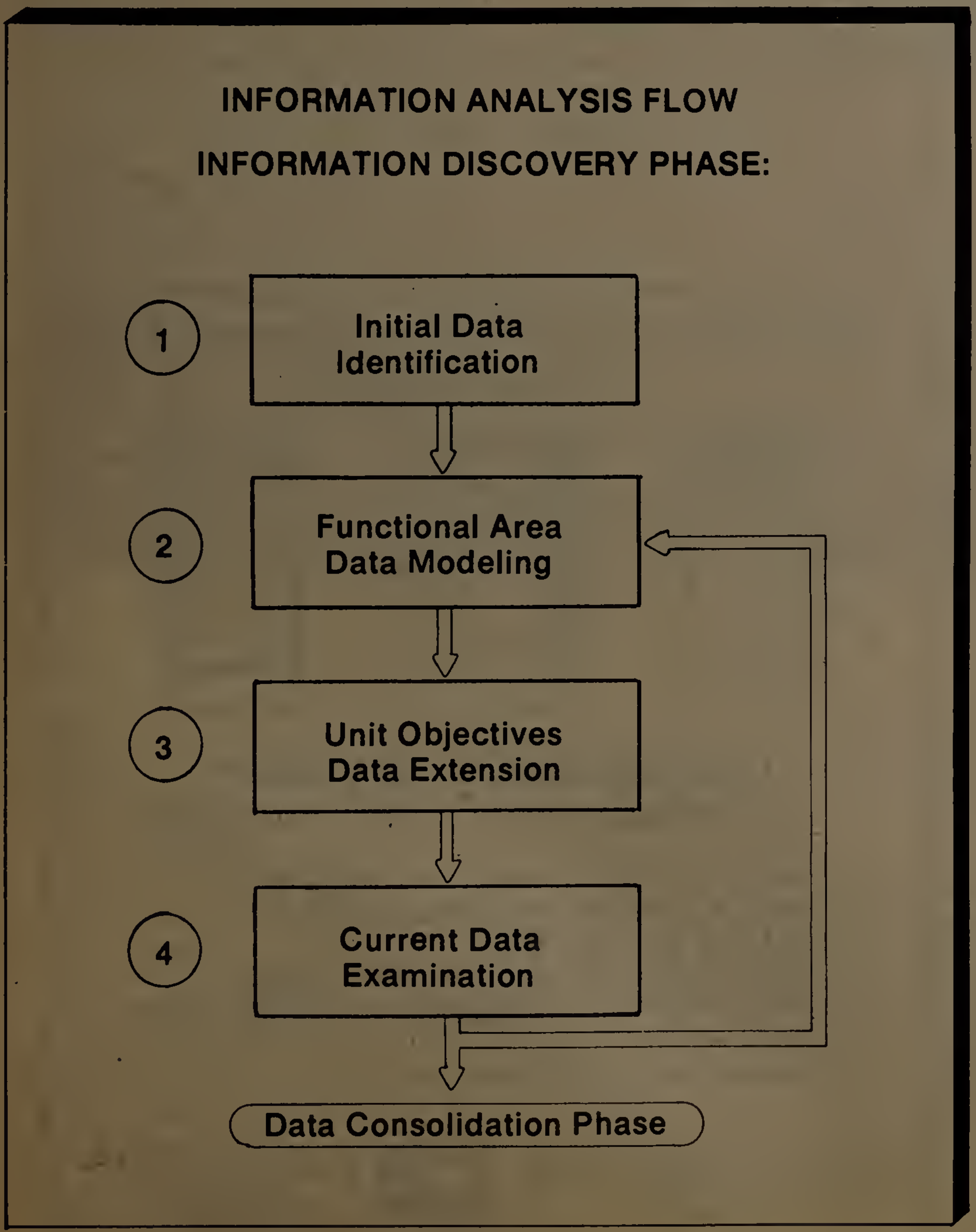
INFORMATION ANALYSIS FLOW
INFORMATION DISCOVERY PHASE:
1
Initial Data Identification
2
Functional Area Data Modeling
3
Unit Objectives Data Extension
4
Current Data Examination
Data Consolidation Phase

Figure 3

DIFFERENT TERMINALS?
DIFFERENT SPEEDS?
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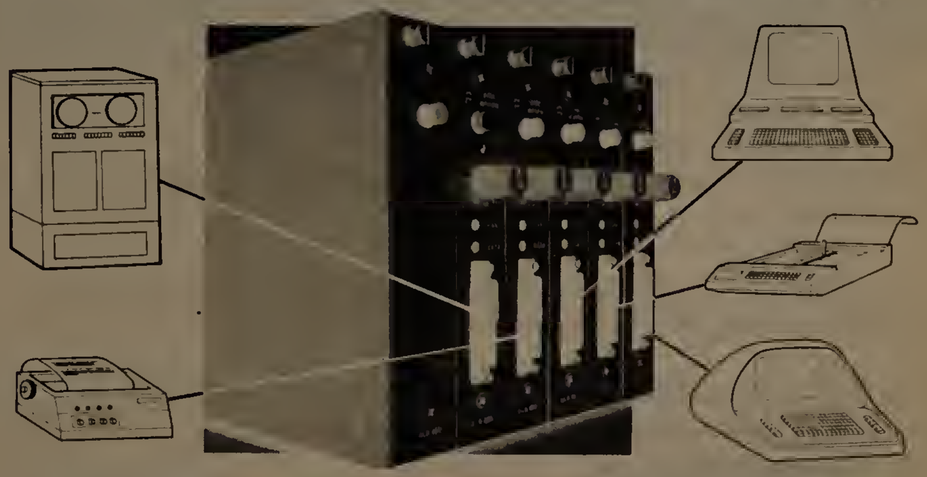

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(Continued from In Depth/7)

The products, services, markets and channels identify the nature of the organization at a particular point in time. An examination of the logistics framework set up by the organization details the mechanism that brings the product or service via the channels to the market.

Functional area data modeling provides detailed understanding — in a data entity form (a schematic data model and detailed data content in an entity list) — of the specific products and services to address particular market requirements. It may address those products and markets as they exist now. In addition, it may project into the future to examine products and markets relevant then.

This detailed examination enables the broad data subject list from Stage 1 to be fleshed out. Data detail relevant to the specific products, markets and channels is defined.

The initial data subjects are more thoroughly examined. Data entities are derived consisting of defined data elements. Functional area understanding is incorporated in the form of an extension to the initial subject list (from Stage 1) and documented in the evolving data model. This schematically represents, for each relevant functional area, the business rules associated with the relationships between various data entities. The data content is detailed in an entity list.

Examination of today's products and markets defines a data model of the organization now. A determination of its likely future products and markets clarifies some of the information needs for the future. It identifies "what the data should be."

Stage 3: Unit Objectives Data Extension. This stage reviews the objectives set by top management to achieve the purpose and mission of the organization (sometimes called its prime objective). While there are a host of typical objectives for an organization, each organization defines objectives that are specific to its environment. Those are projected downward to unit objectives in different business units.

This information analysis stage takes a different view from the previous two stages. In particular, insight is gained into likely areas of change. For example, the innovation objective is a firm policy that keeps the organization always looking ahead to the future. It identifies likely market requirements and products or services appropriate to those future markets.

Objectives must be capable of being decomposed into work: They are actionable and must be measurable. The quantification of an objective enables management to determine whether that objective has been achieved. Management decisions will be based on the degree of achievement. Those decisions may reinforce the activities that contributed to achievement and may change the activities that had a negative effect.

Thus an examination of corporate objectives, projecting down through the organization to identify unit objectives, determines the data that is necessary to measure objective achievement. Objectives identify the data upon which decisions are based. This data is used to extend the data model and entity list developed in Stage 2.

Stage 4: Current Data Examination. This stage identifies data used in each relevant functional area, as documented in manual ledgers, computer files, source documents, reports and inquiries. It gathers this data for each functional area examined in Stage 2.

Stages 1 through 3 identified data based on an understanding of what the data "should be." Stage 4 now identifies data based on "what is" — that is, the data presently used.

This current data is documented in the same schematic data model and entity list format as used in the previous three stages of information analysis. It is not combined with that previously identified data, however, until Stage 5.

Stage 5: Functional Area Integration. This stage combines the data developed during Stages 1 through 3, based on the strategic statements, with data defined in Stage 4 (see Figure 4).

Data that was identified during Stages 1 through 3, and again during Stage 4, is needed for the present, but will also be required for the future. This is firmly incorporated in the data model and entity list.

Data that was identified only during Stages 1 through 3, but not in Stage 4, may be required only for the future. It may not even exist in the current data sources.

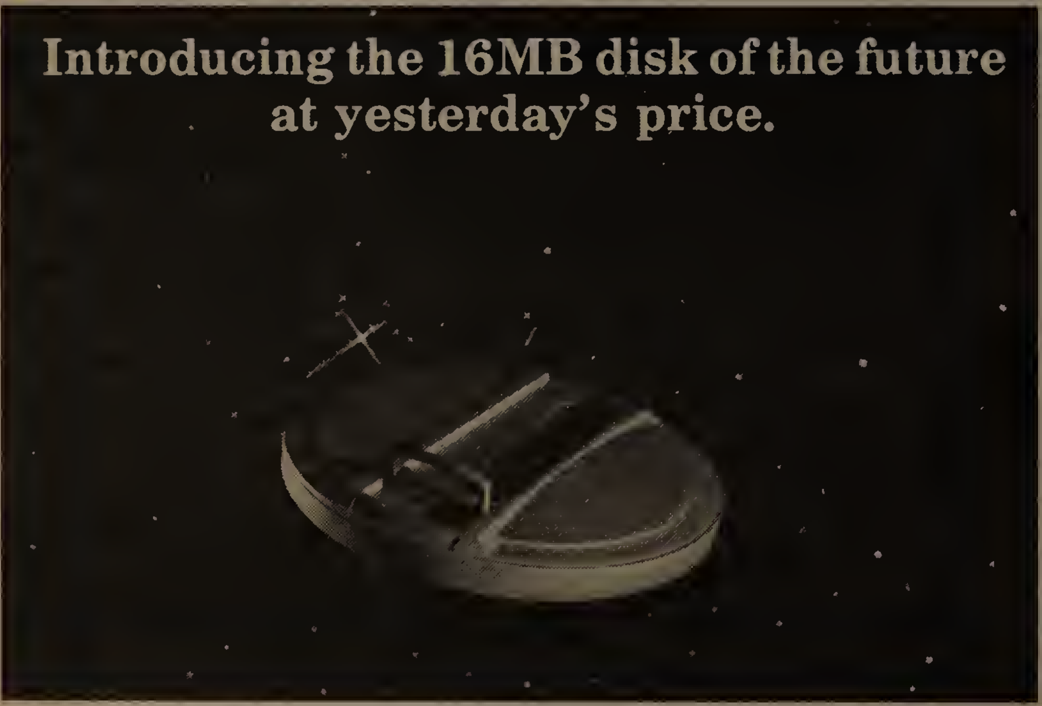
Data that was only identified during Stage 4, but which did not emerge during Stages 1 through 3, may have been required in the past and is still reflected in the current data. Sometimes this data exists "because it has always been there," but it may not be required for the future.

Stage 6: Data Conflict Resolution. The purpose of this stage is to resolve conflict and controversy surrounding the definition and accountability status of data shared across functional areas. It also assesses data that was not identified both during Stages 1 through 3 and again during Stage 4.

Data only identified based on the strategic statements (in Stages 1 through 3) may highlight current data that was overlooked in Stage 4. The examination of omitted current data may highlight further detailed data inconsistencies that require resolution. Or, that data may not presently exist, as it may reflect a new corporate strategic direction.

Data identified only in Stage 4 (based on current data) may no long-

(Continued on In Depth/10)



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(Continued from In Depth/8)

er be required for the future — as it was not also identified in Stages 1 through 3. Or, it may be essential for the future, but was overlooked, either in the strategic statements or during application of Stages 1 through 3, because it was "obvious" — so obvious, in fact, that no one even specified it!

The resolution of these data inconsistencies results in a cross-check, or quality test, of the data identified for today and required for tomorrow. This data is documented in the integrated data model and entity list.

Stage 7: Formal Normalization. The rules of normalization theory are applied to the data identified, integrated and resolved through Stages 1 through 6.

In practice, as the data model evolves through the various stages of information analysis, it is progressively normalized. Stage 7 formally normalizes that data again. This consolidates data throughout the organization and cross-checks the validity of the earlier progressive normalization.

Related data attributes (data elements) are grouped together in each data entity, based on their full dependence upon the primary, identifying key of that entity. The resulting third normal form (TNF or 3NF) entities are more stable and able to accommodate future business change with less disruption and reprogramming than if they had not been normalized.

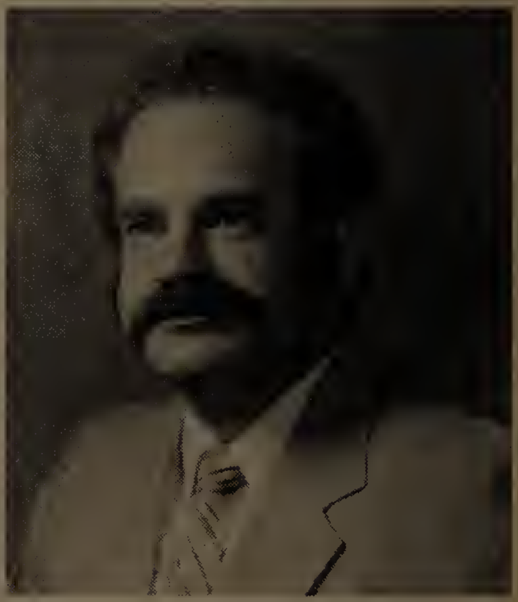
This formal normalization stage cross-checks the correctness of previous normalization and further identifies possible synonyms (same data referred to by different names) or homonyms (same name referring to different data) throughout the organization. It is thus a quality test of the data identified during the previous information analysis stages.

Stage 8. Final Quality Test. The final quality test is a formal cross-check of the data model schematic. The TNF entities developed in Stage 7 are used to formally derive a TNF data model schematic.

This TNF data model documents the TNF data entities and the relationships between those entities.

The model is then cross-checked against the data model produced during Stages 5 and 6. This ensures that all essential data relationships can be represented from the TNF data entities.

Next week: Developing a corporate model with information analysis.



Clive Finkelstein has spent 20 years in DP, 15 of which were with IBM in the U.S. and Australia. He founded Infocom Australia in 1976.

His firm is now known as Information Engineering (Aust) Pty. Ltd. and has subsidiaries in New Zealand and the U.S. The latter, known as Information Methods (U.S.A.) Corp., is located in Boston.

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DATA NETWORKS:

No Cooks in the Kitchen

By Gilbert G. Litchfield

When a person works within a high-technology services organization, he associates with individuals who are acutely aware of the state of technology across a rather broad front. In the remote computing services industry, data communications is an area of particular interest and one that involves significant expertise.

As a result of interacting with data communications specialists, one can develop a false sense of the real world. The impression is that *everyone* knows about data and network communications techniques, alternatives and implementation and operational considerations.

But this is most definitely wrong. Specific reviews of data communications knowledge, capabilities and plans at major firms were conducted during the past year. It became evident very early that the assumed level of expertise within major manufacturing, transportation, energy, distribution, financial and services firms, among others, was inadequate for applying available data communications technology and services to company needs.

In several instances, openings for data communications personnel had not been filled for periods of up to one year. Qualified candidates just were not available. However, many of the firms were conducting business as usual without realizing the deficiencies within the responsible data communications organization.

Challenges of the '80s

The challenge, then, is for business and industry to recognize the role of information transmission systems and the requirement for technically aware individuals who can conceptualize the required solutions and manage their planning, procurement, installation, operation and evolution consistent with the needs of the firm.

As we enter the decade of the '80s, technology places before us the challenge of multiple opportunities for advancement in information processing and handling fields. Each of these opportunities, individually, can consume the technical and managerial energies of a firm.

Among the fastest moving areas are minicomputers, data communications and office automation. We will focus on the challenges and expectations of providing adequate information movement capabilities to satisfy the needs of business and industry.

Major U.S.-based multinational corporations and financial institutions are the targets of a large number of vendors offering communications systems or services. Virtually all industry watchers and forecasters are citing dramatic growth in value-added network services, private data networks, local networks and data use of public common carrier systems. This article presents the results of interactions with more than 30 major firms and discusses the dramatic impact of limited information communications expertise on the pace of network installation.

It is important to note that with the dramatic proliferation of minicomputers, intelligent terminals, office automation products and ever-increasing participation in international markets by U.S. firms, the communications foundation necessary to support these "new" requirements generally is not in place. We find that point-to-point communications links have been a relatively satisfactory solution, but with fast-changing products, technologies and business needs, communications now needs to make up some five or more years of lost time.

If the proper foundation has not been established for meeting the information movement requirements of the early '80s, what has happened? All too often the initial data communications need was satisfied by a request to the telephone company to install a circuit and a couple of modems. The order was initiated by a systems or applications person through the voice services department of the company.

Over time, data communications grew and a technician, who reported to an operations manager or supervisor, was added to the staff. Today, that staff may be one or several technicians, but they are still very black-box- and EIA-oriented.

As a result of growing data communications activity over the past several years, one would believe that the typical firm has a very extensive network. Wrong! It most likely has a large number of data communications links and is also using excessive amounts of the company's voice network for dial-up data traffic.

The challenge of the '80s, therefore, is to establish an organization with the required level of technical and conceptual expertise to develop information movement systems to handle existing business requirements. Then efforts must be focused on being prepared to meet the needs posed by office automation, the proliferation of other intelligent terminals and minis throughout the firm and the exchange, via internetwork communications, of information with other firms and businesses throughout the world.

Executive Influences, Priorities

Increasingly, two additional influences are beginning or are continuing to have considerable impact on the development and evolution of information movement systems within the firm. The first is the role of senior management. It is rare that this level of management has an awareness of or an appreciation for the importance of information communications systems to a firm's efficiency in conducting business and the maintenance of a competitive position within its industry.

Over the years, senior management has been faulted for failing to elevate the information systems or data processing function. Now information systems and DP managers are blamed for the same neglect of data and network communications. Today, the majority of organizations still have technicians responsible for communications, and they report to a level inconsistent with the scope of service that is being requested and required.

Where there has been an organizational recognition of the role of information communications systems, all too often the combination of voice and data services results in management that has experience exclusively in voice services. As a result, one frequently sees a premature effort at integrating voice and data services. Again, this occurs before the required foundation of expertise and services is in place.

The second influence is that of priorities. They are necessary for creation of a comprehensive and adequately flexible general information communications system that satisfies the current needs of the business as opposed to addressing the speculated

(Continued on In Depth/12)

SOURCE	YEAR	FORECASTED REVENUES
A. VAN Vendor	1985	$600 Million/Year
B. VAN Vendor	1985	$725 Million/Year
C. RCS Vendor	1981-1985	$1 Billion/Year
D. Common Carrier	1981-1985	$1 Billion/Year

(VAN — Value-Added Network)
(RCS — Remote Computing Services)

Forecasts of Private Net Installations by Various Industry Participants

(Continued from In Depth/11)

needs of office automation or electronic message systems.

Communications capabilities and expertise are five or more years behind the available technology and users' needs. The most critical assessment that must be made by management concerns the ability of the total organization to assimilate the technology and systems that are proposed for installation over various time periods.

The staff responsible for the different elements of the information communications system will be critical. Not only will there be a major problem of assimilation by the total organization, but the information communications group will become diluted with conflicting priorities as a result of being involved in multiple advanced projects. The communications services required to facilitate successful use of these new systems will break down and fail to perform as needed.

Data Communications Growth

At this point, it is appropriate to assess the magnitude of data communications activity over the next several years. We have used estimates of the realizable markets for turnkey private networks and value-added data communications network services.

Since some portions of the private networks market will be satisfied by specialized enhanced communications carriers, the information presented is not intended to represent a net market forecast (see figure).

Along with the expected growth of private networks will be the entry of several new services organizations as well as the evolution of present service firms in the offering of enhanced or value-added communications services. Various industry market research firms have estimated these services will grow to $370 million in revenues in 1982 and to between $1 billion and $1.3 billion by 1984.

Revenues expected for 1980 were on the order of $50 million for private networks and $100 million for enhanced communications services.

One can readily see that dramatic growth in the use of communications services is expected over the next several years.

Available Network Alternatives

There are three principal approaches currently available to firms in addressing their information communications needs: 1) develop solutions internally, 2) acquire turnkey private network capability and 3) use public value-added services.

Within the first two alternatives are many vendors that provide the components to build one's own capability as well as an adequate set of suppliers that offer the total solution via turnkey networks. Value-added services, practically speaking, are currently limited to two vendors. However, in the next two years, one can expect at least three to five additional value-added network suppliers.

In addition, some users must consider the possibility for extending networks to Europe and the Far East. Virtually all multinational and large domestic firms will require more than one communications system to satisfy all their essential requirements.

If one were to assess comprehensively the available alternatives

(Continued on In Depth/14)

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(Continued from In Depth/12)

within each of the approaches, there would be at least 10 to 12. The assessment process would be compounded with overall planning and management considerations when international communications is involved.

This is not a task for a technician, nor is it a task for a one-person or part-time staff.

The material reviewed above has cited the considerable dependence that business and industry have on those responsible for information communications systems. To achieve the expectations of management and to implement communications services and products dependent upon such capabilities, it is essential that we understand the current status of the expertise within firms using communications systems and within those firms offering solutions in the form of services or products.

It is important to note that there are very large numbers of technicians and engineers who are very competent and familiar with elements of the information communication system. However, what is of interest and importance to management is the availability of individuals who can guide all facets of an information communications capability for a firm.

Recent Examples

Let's now review several specific examples of recent information communications activities, some currently in process in major U.S.-based companies.The intent is to reflect on a condition that is prevalent across virtually all business sectors and all sizes of firms. What may sound extreme in the following examples is indeed occurring today.

Comments are not made to belittle or make light of the circumstances cited. It is important, however, to call attention to a situation that must be addressed by management to ensure successful business operations.

The examples reviewed here are taken from a cross section of U.S. business and industry. In this age of rapid change, the reference to history, relative to these examples, addresses incidents that have occurred during the past several months.

- A major financial institution has some nine application-specific data networks. As new services are being planned for its marketplace, it has found that the majority of the required data is already being captured in other established systems. However, the new service or application will be on processor X and the needed data is part of applications on processors A and B. Further, the "networks" supporting the applications on A and B are exclusively for these applications.

To facilitate the rapid and user-transparent movement of information throughout a network with more than 100 sites, the firm initiated a project in early 1979 to create a single integrated, highly flexible network. It expected to create the required data communications network by late 1980.

Today, after almost two years, a plan has not yet been drafted for the proposed project. Instead, since the project was part of operations, considerable concern was raised about the vulnerability of the current set of application-specific networks to the major outages and deficiencies in daily network management and backup/redundancy. The focus, therefore, has shifted to addressing the daily operational environment of the current application-specific data communications systems. The result of this change will be the establishment of a long-overdue network control center.

However, the number of physical sites to be supported by this institution is expected to increase by at least 300% in the next eight years. In addition, information movement needs will naturally grow and new services will be offered through all locations of the firm. The current efforts with the existing network are essential. However, there still is no planning project to initiate development of the replacement network with its added functions and capability.

- Another financial services firm has operations throughout the U.S. The company is made up of several wholly owned subsidiaries, most acquired in the last few years.

Each of the businesses is oriented

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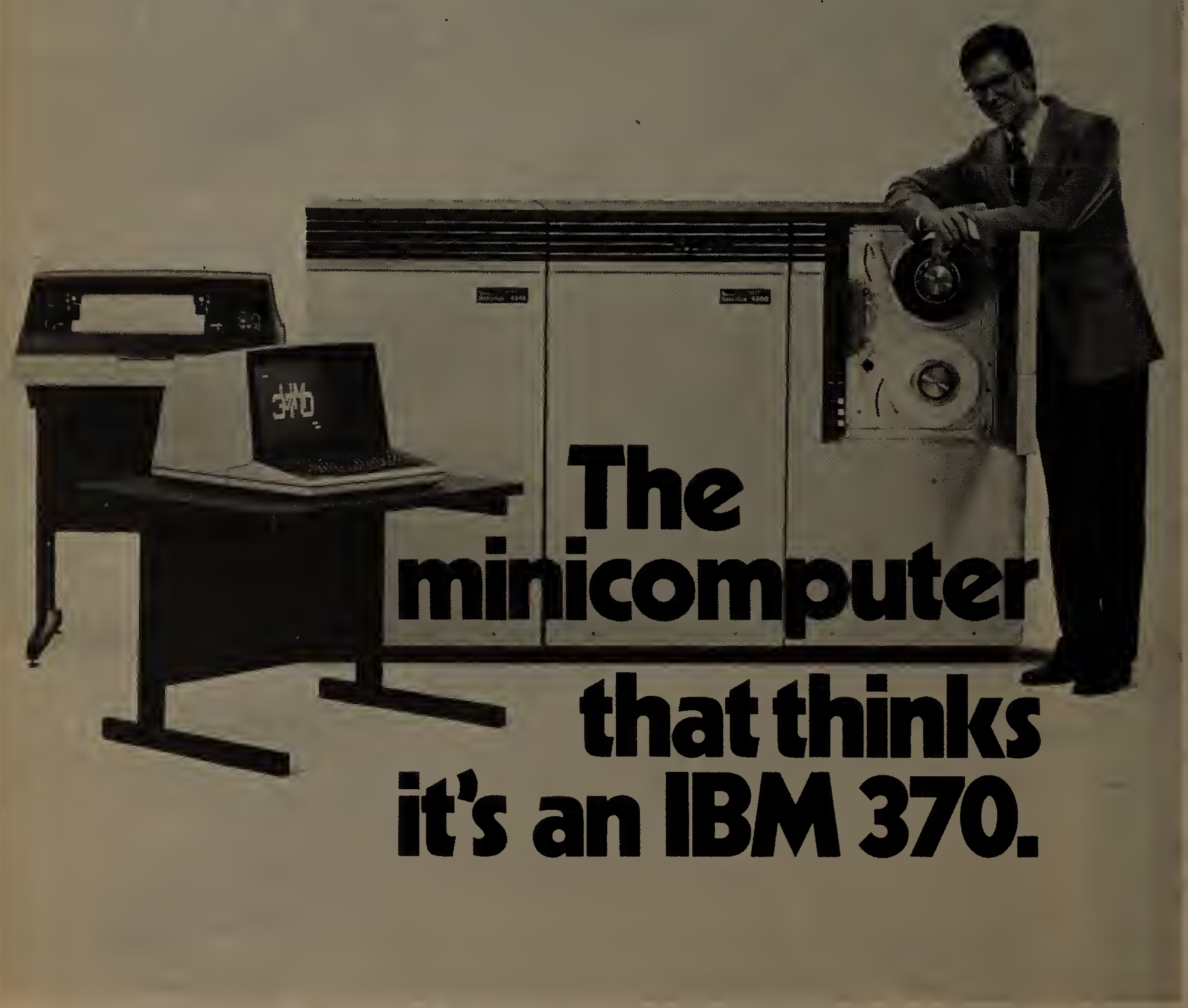

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During the past several months, considerable attention has been given to the cost and function of the communications systems in use. The expectation was that the current fragmentation could be analyzed, resulting in lower costs with, at worst, the same level of service. However, the firm did hope for an improved service environment.

Progress to date has consisted of the minor elimination of some underutilized circuits in one business. More important, in the absence of an internal person capable of performing or guiding an overall analysis that would result in sound recommendations, outside resources were sought. Consultants were retained to analyze the current usage patterns, perform a requirements analysis and recommend corrective action.

Early in the efforts of two separate consulting firms that had been retained, both recommended hardware solutions prior to completion of the analysis. In each case, there was a financial relationship between the consulting firm and the recommended hardware vendor. These relationships were terminated.

Still, even though the business is virtually 100% communications-dependent, only one subsidiary has an individual with communications as a specific responsibility. As a result, a member of senior management has been addressing the information communications needs of the total firm. In this case, there is an excellent perspective on the needs of the business on one hand, matched with very little technical appreciation on the other. Finally, and most important, any attention given to the area of communications by this individual is necessarily very intermittent.

International Operations

- The involvement of U.S.-based firms in international commerce is growing at a very significant rate. Successful performance by these firms in the international marketplace is increasingly a function of their ability to handle the movement of business transactions and information quickly, efficiently and economically.

A financial firm with operations throughout the U.S., Europe, Asia and South America has found that its competitive position in international markets is being eroded, largely as a result of inadequate information movement capabilities.

Currently, Telex and courier services are the principal means of communications with foreign sites. The most recent change in international communications within this firm was the increase from one-half speed to three-fourths speed for the Telex service.

Required and expected by management is the timely availability of information as to specific country economic data, complete office accounting data, customer status on a global basis and the ability to request and receive special information through a highly reliable and timely message system. In addition, there is a requirement for access to and integration of at least four additional network services that are specific to, and required by, firms in the financial services industry.

The realization of these expectations and satisfaction of the communications requirement have been dependent upon personnel whose only experience has been with Telex services.

- Limited communications expertise and resources frequently result in major or even rather routine communications activities being deferred in favor of higher priorities. Higher priorities result when DP management reverts to the familiar, installing new hardware and/or software, rather than pursuing, in parallel, the greater unknown of establishing a more functionally powerful and flexible data communications network.

A major firm has acquired additional subsidiaries and established major new operational sites in the last two years. Management wants to provide the same level of information-handling services for the remote locations as are available to headquarters-located organizations. To ac-

(Continued on In Depth/16)

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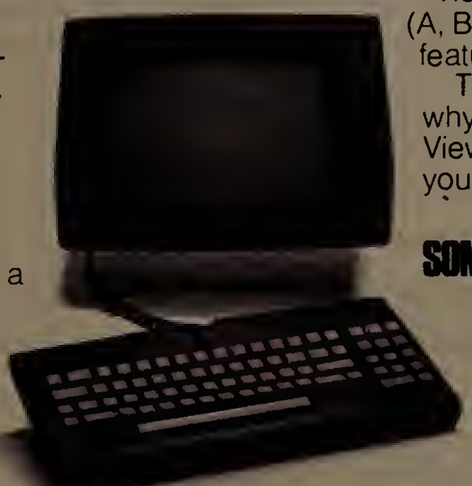

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(Continued from In Depth/15)

complish this objective, the current point-to-point data communications links will be replaced by a significantly enhanced communications network.

Efforts toward establishing an overall program schedule and identifying the appropriate and necessary resources were to begin early in 1980. Some 15 months later, the program has yet to be initiated. Since the communications staff capability consists of a data communications technician who maintains the modems and circuits, the DP manager was to direct the communications program. However, a major mainframe installation and DBMS conversion program has taken a higher priority and resulted in the deferral of the network program.

- A final example. One of the largest manufacturers in the U.S. has tens of thousands of miles of data communications links between major operations and the headquarters computing facility. Services range from 300 bit/sec asynchronous to 9,600 bit/sec synchronous. A few locations are served with multiplexers, and the remainder have a single leased line per terminal.

In 1978, the DP services organization decided to plan a replacement network with increased function and capability. One of the major divisions of the firm has recently added both mainframe hardware and supporting communications because of its inability to utilize corporate computing systems via the limited functions and services of the corporate network. The DP organization is still planning to plan the new network.

Time and space do not permit the review of many similar examples of firms that are having considerable difficulty utilizing electronic information systems. The reduced cost of the minicomputer and competition-motivated services, among many other reasons, make solving the information delivery system problem difficult. The job is beyond the experience of the vast majority of those responsible for communications systems.

Today's Realities

What are the reasons for the lack of progress in satisfying the data communications needs of business and industry? Very few individuals have had the opportunity, time and experience to conceptualize, create or acquire extensive and functionally sophisticated information communications systems. In short, the pace of utilization of the computer has outstripped the development of the required expertise to manage the development or evolution of needed communications systems.

The typical individual responsible for data communications was previously involved with voice services, worked as part of the systems software group dealing with communications modules or was a hardware technician.

All too frequently, requirements for service in support of a new application or remote site are taken to AT&T for assistance. The result is an AT&T solution — nothing more, nothing less.

For example, within the past few months, a novice tried to establish a link between the UK and the U.S. The AT&T solution cost about $4,000 per month. This approach was viewed by the requesting company as very acceptable in light of the requirement for international data communications. However, upon being exposed to a broader set of alternatives, the firm selected a value-added network service that would be more reliable, straightforward to use and is expected to cost about $600 per month.

Personnel responsible for telecommunications do not have an awareness of the available alternatives. Therefore, only one approach is pursued; it is frequently the most costly and offers minimum flexibility in addressing future requirements.

Even when more than one solution is evaluated, there is very often a bias, which ranges from modest to very strong, to "do it in-house." That solution involves taking on the full responsibility of planning the information communications network, selecting the components, writing some of the software, integrating the components and generating the ulti-

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(617) 879-0700		(201) 967-1350	(415) 421-7330	

When this approach is selected, it is picked for reasons of control and meeting special needs of the firm. However, an extremely small fraction of major companies have the expertise and time to pursue this most risky solution of all. With the scarcity of appropriately skilled personnel, this approach most often compounds the problem rather than satisfying the justifications cited above.

The technician or loyal employee put in charge of data communications generally doesn't have the background to conceptualize the overall needs of the firm and then orchestrate the elements essential to a viable communications capability. As a result, communications facilities are installed, not planned; interconnectivity is addressed separately for each application; reliability and availability are not understood or measured or are considered to be too costly to achieve the levels desired. In addition, the potential for growth is limited, function is insufficient even in the near term and flexibility is severely restricted.

Individual managers attempting to satisfy the needs of their business unit will, in light of the insufficient function and flexibility of corporate communications, begin to solve problems specific to their unit. This results in the creation of many stand-alone networks to service individual divisions and considerable redundancy in capability without the benefits of improved reliability. In addition, the organization faces a very significant cost in staffing and creation of data communications expertise within each division.

Diluted Management

Further, the inclusion of communications responsibility within the division results in the dilution of management time and attention to the needs of the business unit, increases staff — which is highly susceptible to turnover — and adds costs and operations responsibilities inappropriate to the staff's prime mission.

Since only a few hundred individuals have the required capabilities cited above, traditional solutions are the order of the day. For example, more application-specific data communications facilities are installed or situations occur where several FAX units all communicating with the same European city continue to incur costs in excess of a leased line.

As firms increase their use of DP systems and associated remote hardware, they will find that a single communications solution is less and less likely to meet the full set of needs.

Required will be an internal private network or point-to-point links, use of value-added network services, local networks, industry-specialized networks and international public data network services. The alternatives cover such vendors as remote computing service firms, GTE Telenet Communications Corp., Tymnet, Inc., ITT, future services of AT&T, the Xerox Telecommunications Network (Xten), Satellite Business Systems (SBS) and specialized service firms. Each has or will have particular capabilities and limitations.

The absence of communications expertise will force users to turn to vendors for the required solution and assistance. Most communications services firms will have some very capable personnel. However, the rate of growth in the use of true network communications and demands on the services of these firms will have them competing as heavily as the rest of business and industry for the required personnel. As a result, only a small fraction of the firms with significant information communications needs will be able to be properly satisfied by the services firms over the next five years.

Knowing we have challenges in solving communications problems on a timely basis with the current level of expertise, what solutions are available?

Several actions must be taken to assure that the organization adopts a knowledgeable approach toward addressing the spectrum of business needs. The key is to ensure that senior management has an appreciation for the role of data communications in the success of the business. This must be approached on two

(Continued on In Depth/18)

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(Continued from In Depth/17)

fronts.

First, users must identify the exposures resulting from a program of status quo or "natural" growth in capability. Second, they must cite the mandatory and beneficial aspects of a considered communications plan and capability viewed in the context of business needs.

In addition, the firm must acquire the expertise necessary to act as the catalyst in creating a functionally viable communications group. While the necessary quantities of skilled personnel will not be generally available for several years, one key person is required. That person will create, over time, the staff required.

Finding the right person, however, is easier said than done. Where does one find the talent? There are three principal sources: remote computing services companies, large corporations and hardware manufacturers.

The best qualified individuals will be from the remote computing services firms and large corporations with one or more major data networks. Hardware manufacturers will have staff concerned with the communications hardware, software and interfaces and, therefore, those people will be reasonably knowledgeable about the elements required in developing a satisfactory data communications capability.

Communications is a service to be provided in support of internal user departments and external users of the company's products and services. Individuals who have had the benefit of obtaining their experience within a services company will already appreciate the role of the communications function.

Next the organization must develop the strategic requirements for data communications to support the business' strategic plan. The data communications plan should have at least a five-year horizon, but 10 years is preferable. This effort should take no more than 60 days and involve the key user organizations of the company.

Finally comes the step that often causes the most controversy: The firm must alter the organizational placement of the data communications function and the control it is to have over company communications solutions and services. The change in organization should, at a minimum, place the responsibility for information communications reporting to the DP manager. Ultimately, which should be sooner than later, the function should be on a par with and report to the same senior management level as does data processing.

This position assures that responsibility for data communications is part of the information systems and service organization of the company. Information processing and delivery systems must be managed under the same basic set of strategies to assure responsive services to the business.

Communications needs will not be solved exclusively by turning them over to AT&T, GTE Telenet, Tymnet, Southern Pacific Communications, MCI Communications Corp., SBS, Xten or any other current or planned service. In the foreseeable future, no one service will satisfy all needs relative to cost, function and geography. Business and industry must have the internal expertise to select and manage the alternatives that can best satisfy their needs.

Gilbert G. Litchfield is vice-president of Network Communications International. He has been involved in creating communications systems for business, as well as strategic planning for information movement systems, for the past 18 years. He holds a B.A. in physics from the University of Colorado.

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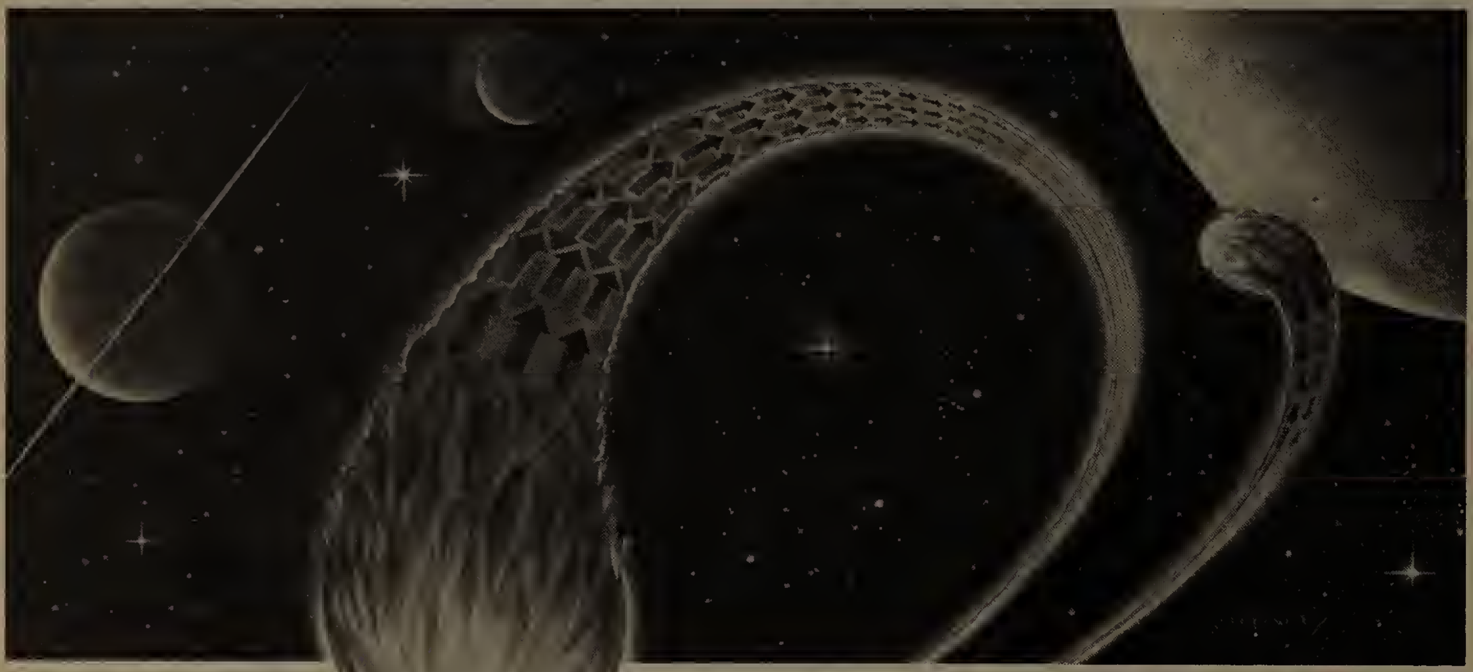

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NCR Introduces Micro-Based COM

DAYTON, Ohio — NCR Corp. has announced a microprocessor-based computer-output microfilm (COM) system, the 5330. Components include 10M bytes of hard-disk storage, one or more medium- or high-density tape handlers, a CRT terminal, a thermal printer and a microprocessor-controlled fiche processor.

The processor is a self-contained unit that offers 128K char. of memory, a film cutter, a premixed Chem-Pak processsor and a COM camera. The 5330 employs a vacuum system to assure gentle film handling and resolution accuracy and a laminar airflow system to provide a dust-free environment, the vendor said.

Fiche can be produced in about four minutes and subsequent fiche can be produced at one-minute intervals, according to the vendor.

An average 5330 system costs $155,000 and first deliveries are scheduled for June, the vendor said from Dayton, Ohio 45479.

Kodak Upgrades Microimage Unit

LOS ANGELES — Eastman Kodak Co. has announced software enhancements and a memory enhancement for its Microimage microfilm processors that reportedly ease the production and indexing of microfilm.

The enhancements include expanded memory in the laser computer-output microfilm (COM) and enhanced capabilities for the firm's Starlink software. Maximum memory in the processor that controls the Komstar 200 and Komstar 300 microimage processors has been expanded from 32K words to 48K words. This expansion permits the laser COM units to create indexes in a 16mm microfiche file as it is being produced, the vendor said.

The Komstar 200 costs $108,000 and the Komstar 300 costs $123,000, the vendor said from 343 State St., Rochester, N.Y. 14650.

Forms Feeder Out For IBM 3800s

CROZET, Va. — Acme Visible Records, Inc. has announced Laser-Feed, a continuous forms feeding unit for IBM's 3800 laser printer.

The freestanding, perpetual forms feeding unit can increase forms throughput of non-impact printers by 30% each hour, a spokesman said.

The unit leases for $300/mo on a 24-month agreement or costs $5,800 from the firm at 1000 Allview Drive, Crozet, Va. 22932.

University of Umea staff members utilize terminals linked to CDC Cyber mainframes for academic and research work. Operating as a not-for-profit research agency, the university's computer center serves both campus and community needs.

University's Cybers Handle A Third of Sweden's DP Load

Special to CW

UMEA, Sweden — Quick now — where is the last place on earth you would find computers, terminals and thousands of miles of communications equipment?

Here at the University of Umea, of course. The research and educational facility is located about 400 miles north of Stockholm in the last major city before going into the sparsely populated area of Lapland.

The university is equipped with a Control Data Corp. Cyber 172 and recently added a Cyber 730. The second and more powerful computer will soon take over the duties of the 172 so that the system can be dedicated to the Plato computer-based education facility, the first in Sweden, according to Dr. Orvar Arvedson, a medical doctor and director of the farflung computing center.

Since 1964, the university has used CDC computers in its role as one of Sweden's six regional data centers for higher education and research. The University of Umea handles about one-third of the country's computer load and has the largest geographic responsibility. It operates as a nonprofit commercial institution and its use is equally divided between educational duties and external customers.

The university started its computing history with an IBM 1620 and a CDC 8090 and eventually moved to time-sharing with a CDC 3600 computer at Uppsala University, another regional computing center. The Umea center was the first in Europe to install CDC's EDMS-170 and DMS-170 data base management systems, which not only facilitate research and academic endeavors, but are important to state institutions like Sweden's Ministry of Industry.

The Ministry of Industry has 28 terminals linked to the Cyber 730 and uses the system to build models and run simulations to determine future work distribution and population trends in Sweden.

Another use of the data base involves cancer registry. Terminals installed in doctors' offices and hospitals are used to type cancer patient data such as type of cancer detected, treatment and results, Arvedson stated.

Study of Families

One particularly interesting project that makes constant use of the Umea center is a study on Swedish families that involves about 100 persons, previously unemployed and without local job prospects. Code named the Haparanda Project, for the village in far northern Sweden where the research is based, the study is in its sixth year and has volumes of data on families dating back to 1650, Arvedson explained. Key-to-disk units are installed at the village for recording information read from such written artifacts as withered church and birth records. Those working on the project are specially trained to handle and decipher the aging documents.

Magnetic tapes are regularly sent to the Umea center where they are read into the Cyber 730, the director noted. Eventually, the Haparanda Project will provide Sweden with a highly detailed account of early family development and migration in the far northern sections of the country.

(Continued on Page 64)

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Bits & Pieces

CAD/CAM Family Gives Large-Scale Performance

BEDFORD, Mass.— Computervision Corp. is offering the Designer M family of computer-aided design/manufacturing (CAD/CAM) systems which it said offer the same level of performance as the firm's large-scale Designer IV system but at a lower cost.

The family of turnkey systems is available in a number of packaged versions for applications, including mechanical design and drafting, manufacturing engineering/numerical control, printed circuit design, cartography and others.

Priced at $180,000, the Designer M system consists of the vendor's CGP-80 graphics processor with a fixed-media disk and magnetic tape drive, two Instaview M raster-scan interactive design workstations, the firm's Graphics Operating System, a system console and one CAD/CAM software application package. Computervision can be reached at 201 Burlington Road, Bedford, Mass. 01730.

Xerox Offers Controller, Color Terminal System

EL SEGUNDO, Calif. — Xerox Printing Systems Division has announced a controller and color terminal system that allows two pictures to be printed on a single page on the Xerox 6500 printer.

The Intron 6580 controller transmits images for printing. The controller, terminal and printer can generate 4-in. by 5-in. prints or full-size prints. Output is 192 pages per hour amd seven colors can be reproduced, the vendor said.

The Xerox 6500 costs $31,000 from the vendor at 880 Apollo St., El Segundo, Calif. 90245.

Stand-Alone POS Performs Inventory Recordkeeping

SCHAUMBURG, Ill. — A stand-alone point-of-sale (POS) terminal designed to perform perpetual dollar inventory recordkeeping and analyses of variables affecting merchandising and productivity has been unveiled by Omron Electronics, Inc.

The RS80-10 terminal is designed specifically for general merchandisers and nonfood specialty retailers such as hardware, automotive, clothing, jewelry, home furnishings and appliance stores.

The RS80-10 costs $2,695, Omron said from 650 Woodfield, Box 4008, Schaumburg, Ill. 60195.

Bar Code Reader Features Wand-Reading Symbology

WEBSTER, N.Y. — A bar code reader with switch-selectable symbology for wand-reading large volumes of code in a short time has been announced by Photographic Sciences Corp.

The Quick-Check reader features solid-state construction and a visual LED display that indicates when a symbol is in or out of agreement with the published specifications. Five codes are built-in, with special codes available for further flexibility.

Quick-Check costs $2,595 from 770 Basket Road, P.O. Box 338, Webster, N.Y. 14580.

Internal Self-Test System Offered for Microstreamer

SAN DIEGO — Cipher Data Products, Inc. has announced an internal self-test and diagnostic test system for its Microstreamer streaming tape drives.

The package is based on the same tests used to initialize the streaming drives. It reportedly allows the user to help prevent operational errors and diagnose tape drive problems, even while the drive is in use, the vendor said.

The testing software is included in the purchase price of the drive, which costs $3,850, the vendor said from 10225 Willow Creek Road, San Diego, Calif. 92131.

Swedish School Houses Cybers

(Continued from Page 63)

"It is rather ironic, but this project involving historical data gave us our first experience with data base technology and prodded us to pursue it further," Arvedson pointed out.

Right now, the center serves close to 1,000 terminal users at a given time. But when the Plato system is fully operational, the computer center will have a second network of terminals.

"A first-year student or small external user doesn't need the power and sophisticated processing of a Cyber 730," Arvedson said. "With a microcomputer network linked to the Cyber, we can provide students, faculty and external users with the exact level of computing they need without costly overhead."

As a regional data center, the Umea Center also provides time-sharing services to three other major educational institutions: The Technical University of Lulea, the University of Sundsvall and the University of Ostersund. Each is linked through a network of small computers such as Digital Equipment Corp. PDP-11s and the Norwegian computer Nord.

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Remote Setup Speeds Firm's Billing

TOLEDO, Ohio — Customers seldom look forward to getting bills, but for vendors, getting the bills out on time can make the difference between staying in business or running into problems.

For the small business, the idea of buying a full-blown computer system just to handle billing may not be economically feasible. One firm here has turned to IBM's 5280 distributed data system as a solution to the problem.

Announced in January 1980, the 5280 uses terminals that can process information at remote locations and transfer that data through communications lines to a central computer system.

The Composite Can Products group of Owens-Illinois, Inc.'s Forest Products Division will use the 5280 to speed up invoice processing. The group has had difficulty in the past using conventional methods to get invoicing data to its Toledo, Ohio, headquarters for processing.

The process was taking too much time and started to affect cash flow seriously.

"We were experiencing anywhere from seven to 10 days' delay in getting invoicing data here for processing on our IBM System/34 processor," according to Harry Cooke, manager of information systems for the Forest Products Division.

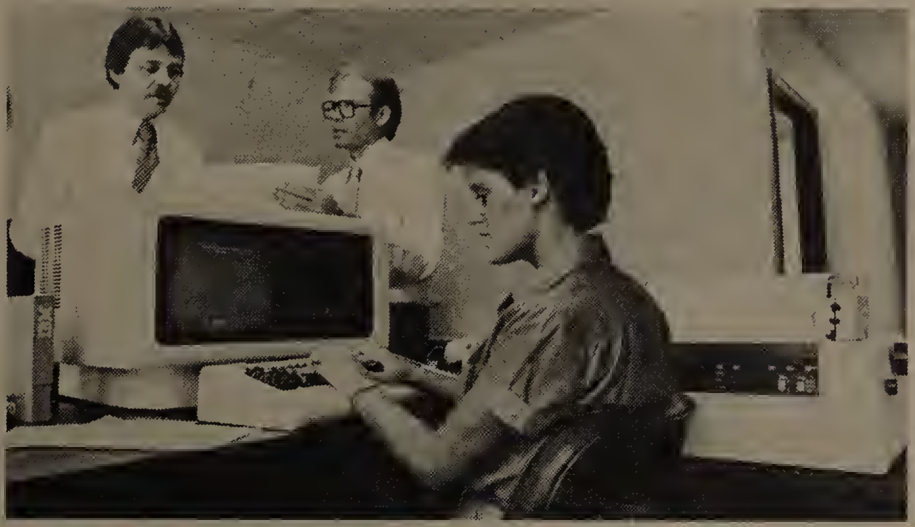
Owens-Illinois plans to install one terminal in each of the plants which manufacture paper-and-metal combination containers such as frozen orange juice concentrate cans.

Cost Justification

"The real reason we jumped on the 5280 was that it presented us the opportunity to expand our information systems network into the Composite Can plants," Cooke said. "We really did not have any data processing equipment there because the size of each plant did not justify the cost up until this time.

"The 5280 will give us batch transmission of the data from the plants rather than relying on the mail system, and that will produce real improvements in the issuance of the customer invoice without the seven- to 10-day lag period."

According to Cooke, in the past the invoices have been mailed from Toledo once processing was completed. The invoice data will now be transmitted back to the 5280 terminals in the plants where they will be printed and mailed to customers, he said.



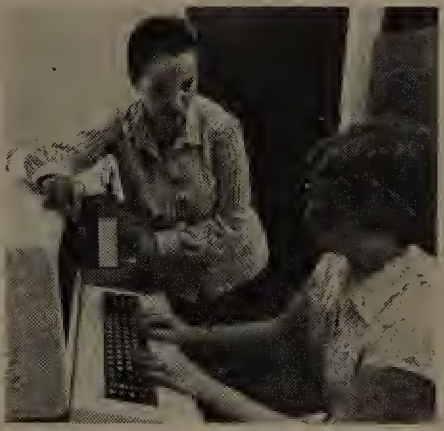
Sales manager Mo Yarborough (left) and William Ziegler watch Julie Thomas enter information into IBM 5280.

"The real justification for the 5280 is in the area of accounts receivable and inventory management," Cooke said. "We estimate that we will reduce our average sales outstanding by a minimum of seven days."

Gordon Bentley, a senior systems analyst on Cooke's staff and project leader for the 5280 installations, said he expects to have systems in all the plants by the end of September.

"The first applications we are going to install will be trade billing (invoicing), affiliate billing, can line production reporting and press line production reporting," Bentley said . Bentley and Gail Gaurin, an analyst/programmer, developed the software for the system using the 5280's Data Entry/RPG programming facility.

Owens-Illinois was one of the first firms in the country to use the 5280. Two other firms among the first to install the system are Ziegler and Company, Inc. in Orangeburg, S.C., and Occidental Petroleum's Zoecon Consumer and Animal Health Division in Dallas.



Gail M. Gaurin, programmer/analyst at Owens-Illinois' Forest Products Division, shows invoicing clerk Vanessa Lynn Eastwood how to operate the IBM 5280.

Micro Offers DP and WP

SUDBURY, Mass. — EEC Systems has announced a microcomputer system based on the Digital Equipment Corp. PDP-11/23 that offers a combination of data and word processing functions.

The Micropower-W system is aimed at small to mid-size businesses and can support up to five users. The system has 256K bytes of memory and features up to 8M bytes of disk storage using a Winchester-type floppy disk, a DEC VT-100 terminal and a letter-quality printer, the vendor said.

The system comes with DEC's RT-11 operating system, TSX-Plus and word processing features and costs $27,600. The LEX-11 word processing package is also available, the vendor said from 315 Goodman's Hill Road, Sudbury, Mass. 01776.

Printer Controllers Fit DG Minis

MENLO PARK, Calif. — Two printer controllers for Data General Corp. Nova and Eclipse minicomputers are being offered by BDS Computer Corp. to reportedly provide up to 2.5 times faster printing speeds at lower cost than comparable DG units.

The BDS Model DPC 40-DS and DPC 50-DS controllers accommodate BDS band printers with speeds of 300-, 600-, 900- and 1,500 line/min. Printer speed selection is controlled through on-board switches. Both controllers are completely bus-compatible with the minicomputer, and no hardware or programming changes are required, the firm claimed.

The Model DPC 40-DS employs an 8-bit parallel data-transfer bus that handles a full Ascii 96-char. set along with vertical format paper movement instructions.

The Model DPC 50-DS has a 16-bit parallel input from the computer with an 8-bit parallel output bus to the computer for handshake signals. It has a 256K-bit random-access memory that reportedly permits the computer to set and clear horizontal tabs in any of 132 positions. Both controllers buffer two data words at up to 100K byte/sec, the firm said.

With controller installed, BDS printers range from $3,250 each to $34,400 each, depending upon printer type and speed. BDS Corp. is at 1120 Crane St., Menlo Park, Calif. 94025.

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CW/5-18

Disk Offering Fits M/NET

SAN FRANCISCO — Micromation, Inc. has unveiled a hard disk configuration that reportedly reduces the cost of its M/NET system and enables the user to expand system capacity while reducing the number of modules.

The system uses a Winchester disk drive divided into 512-byte sectors. This provides for faster program execution and more efficient use of disk storage capacity, the vendor claimed.

The new configuration reduces the original three-cabinet system to two.

Basic unit prices range from $10,500 to $22,000 for a full eight-user system with 215M bytes of storage capacity, the vendor said from 1620 Montgomery St., San Francisco, Calif. 94111.

Disk System Runs on DEC

SUNNYVALE, Calif. — A Winchester system said to provide Digital Equipment Corp. computer users with 41.6M bytes of memory in a rack height of 5.25 in. has been announced by Advanced Electronics Design, Inc.

The Winc-08 Winchester System is software-transparent to DEC operating systems enabling users of both LSI-11 and PDP-11 systems to couple storage their CPUs, the vendor said.

The Winc-08 Winchester System, including one drive, power supply, controller and interface card, is priced at $8,445 with delivery in eight weeks from Advanced Electronics Design, Inc., 440 Potrero Ave., Sunnyvale, Calif. 94086.

Dual Floppy For DEC Users

NATICK, Mass. — The FD-311 dual floppy system being offered by the Charles River Data Systems, Inc. is totally software-, media- and instruction set-compatible with the Digital Equipment Corp. RX02 floppy disk system, yet requires only half the space.

The 5¼-in. rack- or table-mount unit operates with any DEC PDP-11 or LSI-11 series computer. Supplied complete with a test diagnostic diskette, the FD-311 system provides up to 512K bytes of formatted, single-sided storage on each Shugart drive.

The FD-311 costs $3,250 from 4 Tech Circle, Natick, Mass. 01760.

Maxiram Ties To PDP Bus

EL SEGUNDO, Calif. — Imperial Technology, Inc. has announced the Maxiram-15, a solid-state, nonrotating random-access memory system that attaches to the I/O bus of either the Digital Equipment Corp. PDP-15 or PDP-9.

The unit reportedly replaces DEC's RF15 controller and RS09 fixed-head disk drive.

The Maxiram system is hardware- and software-compatible with rotating devices. The unit features no moving parts, zero latency, storage capabilities of from one to eight RS09 disks and can be configured with either core or semiconductor storage modules, the vendor claimed.

Semiconductor memory modules start at $11,500 and core modules start at $15,000.

Imperial Technology is located at 831 S. Douglas St., El Segundo, Calif. 90245.

TI Announces Mini Winchester

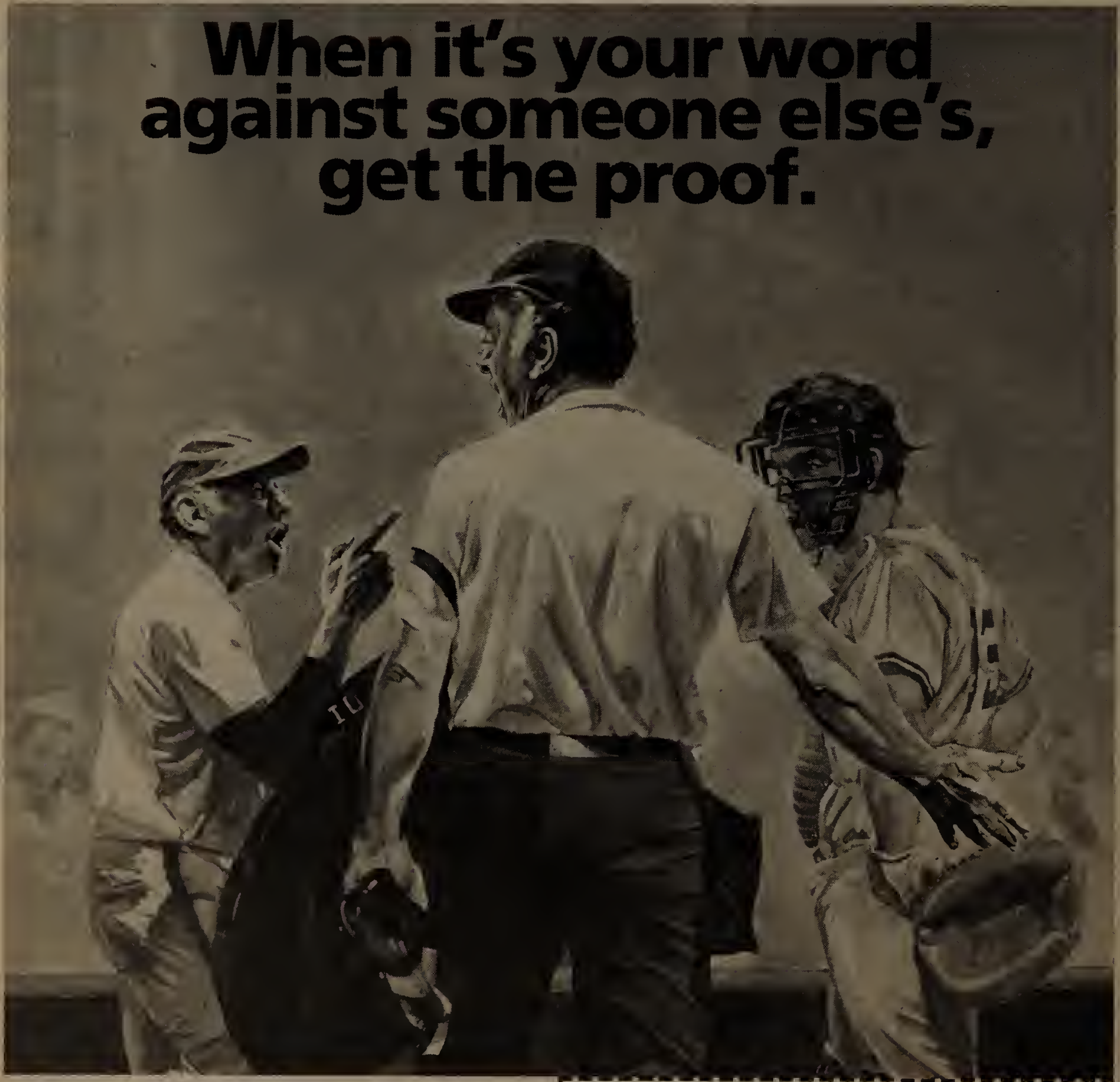
HOUSTON — Texas Instruments, Inc. has announced a 5¼-in. Winchester disk drive.

The unit is packaged in the same basic size as industry-standard mini-floppy disk drives. However, it offers up to 6.38M bytes of unformatted storage, a 170M byte/sec access rate and a 5M byte/sec transfer rate, the vendor said.

The drive costs $1,490. The vendor can be reached through P.O. Box 20245 H-574, Dallas, Texas 75220.

Free Brochures

- "Resource Referral Catalog" lists hardware and software products that operate on current Perkin-Elmer Corp. computer systems and are available from independent companies. The index includes such topics as business and data processing, communications, design and drafting and industrial products. It is available from Perkin-Elmer's Computer Systems Division at 2 Crescent Place, Oceanport, N.J. 07757.
- "The Special Delivery Software Catalog" from Apple Computer, Inc. features 12 user-written personal computer programs that have been selected for publication by Apple for their applicability and quality. The text is available from Apple at 10260 Bandley Drive, Cupertino, Calif. 95014.
- "An Introduction to Information Management" is a 24-page brochure intended for small business executives who are shopping for an information system or expanding an existing one. It can be obtained from Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10067.
- "The Small Business Owner's Guide to Small Business Computers" describes the advantages of owning a desktop accounting and information system. The pocket-sized publication is written in everyday language and is available from Pertec Computer Corp., Department 200, P.O. Box 4095, N. Hollywood, Calif. 91607.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Border States Electric Supply Co.
Fargo, ND

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Chas. A. Strand Company
Detroit, MI

"With the System/38, we can do applications we'd never have dreamed of doing before. For instance, we've come up with coaching reports in just minutes that previously would have cost a lot of time and money. It gives both our coaches and management information they never thought possible."

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Director of Data Processing
St. Louis Football Cardinals
St. Louis, MO

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Mini Bits

Dot Matrix Printer Works With Minis and Micros

WATERTOWN, Wis. — Eaton Corp. has announced the 7000 Plus dot matrix printer, designed for a variety of industrial and commercial applications.

These applications reportedly include generating hard copies of manufacturing records, quality control events and mailing lists and obtaining time, cost and quality information from microprocessor or minicomputer sources.

The unit provides print capabilities of either single-width 40 col at 12 char./in. or 20 col at 6 char./in., the vendor said.

The printer is capable of receiving data at 110-, 150-, 300-, 600- or 1,200 bit/sec and costs $425, the vendor said from 901 S. 12 St., Watertown, Wis. 53094.

MIC Seminars to Cover Minis, Office Automation

CHERRY HILL, N.J. — Management Information Corp. (MIC) has announced a series of interactive training seminars to be held in Chicago, Boston, New York and Cherry Hill designed to give executives a better understanding of the computer requirements within their own companies.

"Selecting and Using Business Minicomputers in 1981" is scheduled for Boston, April 15; New York, June 18; Chicago, Sept. 23; and Cherry Hill, Dec. 11. This one-day seminar is designed for those who plan to acquire a computer system ranging in price from a $10,000 micro system to a $100,000 mini system.

"Selecting and Using Office Automation Systems in 1981," to be held in Cherry Hill May 21-22 and again Nov. 18-19 and in Chicago Sept. 24-25, will also address office automation concepts, word processing products, electronic mail and future trends in office automation.

Registration for the one-day seminar costs $175 and $395 for the two-day seminar. Discounts are available for MIC subscribers, multiple registrations and for payments made three weeks in advance. More information is available from MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

Micro-Expander Offers Z80A-Based S-100 Micro

CHICAGO — Micro-Expander, Inc. has entered the professional microcomputer market with the Expander, an S-100 computer that reportedly requires only a CRT and storage media for operation.

The Expander, however, does not require a separate terminal, providing high-speed operation.

The micro is built around a single board that contains a Z80A MPU, keyboard circuitry, interrupt, video circuitry, real-time clock, parallel printer interface, RS-232 serial interface, and full-color circuitry.

The Expander will be available at the end of May through dealers in the U.S. for under $2,200. Micro-Expander is at 7835 W. Higgins Ave., Chicago, Ill. 60656.

Datamyte Micro Includes CRT, Printer, Disk Drive

NEW YORK — Datamyte, Inc. has announced the Model 234 microcomputer that incorporates a CRT display, plain paper printer, floppy disk drive and full keyboard in a package about the size of an electronic typewriter.

The unit uses the CP/M operating system and offers 64K bytes of random-access memory (RAM). The disk drive has a 400K-byte capacity and the drive can be augmented with an auxiliary disk, the vendor said.

The Model 234 costs $6,980 from the vendor at 527 Madison Ave., New York, N.Y. 10022.

MPU Offers 5.25-In. Disk, 6M Bytes Main Memory

WICHITA, Kan. — A microcomputer featuring a 5.25-in. Winchester hard disk with a capacity of 6M bytes of main memory has been announced by Onyx Distribution, Inc.

The C5000 features a high-speed Z80 processor and high-density cartridge tape backup and is compatible with the Cobol, Pascal and Fortran languages while measuring 8 in. by 13 in. by 17 in., the vendor said.

Available later this month, the C5000 is priced at $9,500 from Onyx Distribution, Inc., 211 Broadway, Wichita, Kan. 67202.

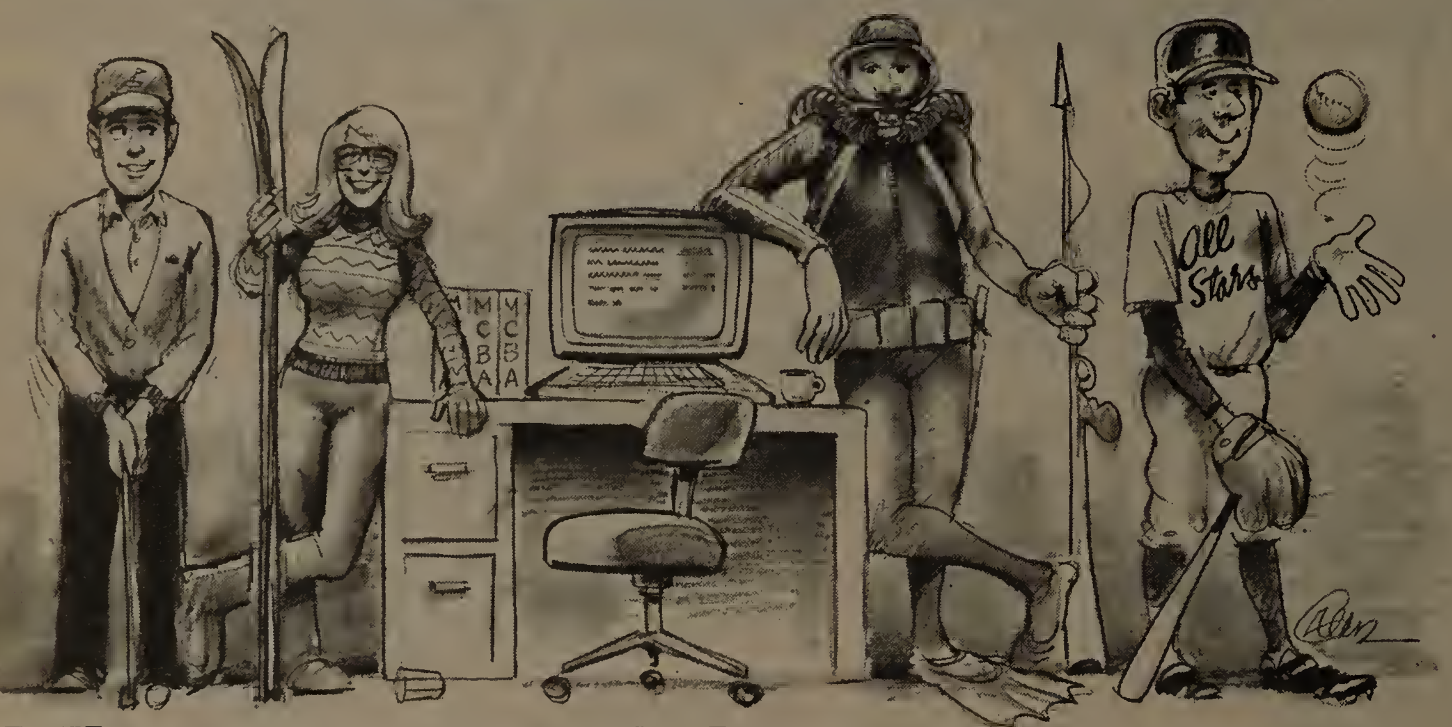
Shared-Logic WP Added To DCC's Unique Line

MEMPHIS, Tenn. — Data Communications Corp. (DCC) has added shared-logic word processing capability to its Unique family of computer systems.

The word processing enhancement operates concurrently with other Unique functions and allows terminal operators to change operating modes via a single keystroke, the vendor said.

Available immediately, the DCC word processing enhancement is priced at $6,000 for existing customers from DCC, 3000 Directors Row, Memphis, Tenn. 38131.

MCBA Software.



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DIBOL-11 packages for PDP-11s and LSI-11s:
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☐ Order Entry/Billing
☐ Accounts Payable
☐ Payroll
☐ General Ledger
☐ Accountants' Client Write-Up
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☐ Accountants' Time and Billing
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☐ Inventory Management
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*These packages are currently in development. Inquire for detailed information regarding completion schedules

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Set to Go Public, Software AG Reaffirms Focus

By Lois Paul
CW Staff

INNISBROOK, Fla. — On the threshold of "going public" and ready to take its show on the road to potential investors, Software AG of North America maintained here that the company is keeping its sights focused on system software.

Addressing the meeting of the Software AG International Users' Group here last week, Executive Vice-President Kenneth D. Rardin said, "Our major emphasis is and will continue to be systems software." He added, "our long-range goal is very simple. We are planning to become the biggest systems software company in the world."

Rardin noted that during the next decade virtually all users will be forced to convert to data base management systems (DBMS) to keep up with demand and to increase productivity.

Strong Suit

Citing Software AG's strong suit as "ease of use," Rardin said, "we have the tools to meet the demands."

By 1985, there will be 2.5 computers installed for every trained programmer, Rardin said. "There will be an enormous demand for application software packages," he explained, adding that Software AG's goal is to be the supplier of system software tools to the application software industry, rather than to diversify and move into application software itself.

"We plan to commit our resources to convert Adabas [its DBMS] and Natural [its transaction processing system] to all of the major application systems," Rardin said.

In line with these goals, Software AG is in the process of unveiling new products and enhancements to existing ones. These include a Natural Advanced Facilities Option, a separate product from Natural, which reportedly will offer increased storage management; multiple parallel operations; dynamic cataloging of user subroutines; multiple report output; printout spooling; forms service; batch printout of

(Continued on Page 72)

Personal Computing Finds New Meaning at NCC '81

By Marcia Blumenthal
CW Staff

CHICAGO — Personal computing took on a new meaning at the recent National Computer Conference here as one-time hobbyist companies such as Apple Computer, Inc., Tandy Corp. and Atari, Inc. took their places on the main exhibit floor alongside mainstream computer firms for the first time .

Systems offered by these firms have become productivity tools for professionals and middle managers who are using them as personal workstations at their offices, not at home.

After last year's NCC in Anaheim, Calif., firms such as Apple and Radio Shack, previously confined to the personal computing festival section of the show, asked NCC show management for representation on the main exhibit floors. These vendors thought they had paid for a fair part of the show, but were not getting their fair share of the show's traffic.

"We are going after the business market, so why shouldn't we have the same exposure as other computer makers? " observed Phil Roybal, manager of Apple's communications program.

At this year's conference, the personal computer workstation concept was blessed by "Brother Dominic" and Xerox Corp., which showed its newly introduced 8010 Star Information System. The firm calls the Star a "personal information system for business professionals."

Throughout the four-day conference, which attracted 73,000 visitors, attendees craned their necks to get a view of the Star system.

Osborne's Primitive

The Osborne 1, a portable 25-lb system from Osborne Computer Corp., got the air circulating in the stuffy, overheated lower depths of McCormick Place. Looking about as primitive as early models of portable typewriters and sewing machines, the Osborne 1, outfitted with six applications programs, was designed specifically for professionals like product managers or advertising executives, noted Georgette Psaris, vice-president of marketing.

The price tag for the system is $1,795 with the software and it will be marketed exclu-

(Continued on Page 74)

Adapso Position Paper on IBM Opposes Reentry Into Services

ARLINGTON, Va. — IBM should not be allowed to reenter the information processing services business unless it establishes a separate subsidiary for that purpose, the Association of Data Processing Service Organizations, Inc. (Adapso) said in a recently adopted position paper.

The position paper was adopted at Adapso's 54th Management Conference in New Orleans late last month. However, it was not made public until the first week in May, after it was circulated to the U.S. Justice Department and IBM [CW, May 11].

In the position paper, Adapso also urged IBM to assure that its software and professional services products remain unbundled from any other product and service and that they be fairly priced on a full-cost and reasonable profit-margin basis.

"IBM's dominant position in the computer equipment market gives it an unfair competitive advantage in the software products and professional software service businesses," the organization contended. To control that favored position, Adapso called for IBM to "make available on a nondisclosure basis the technical interfaces for its product and service offerings [including hardware products] at the same time as such interfaces are first made available within IBM for development purposes."

Adapso further said that IBM should update the interface information until the product is publicly announced.

Moreover, the position paper said that IBM should not announce any products or services until an operational prototype exists. At the time of an announcement, IBM should make "complete interfaces, functional, performance and pricing information available as well as full details of the hardware and software environment in which it will operate."

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Software Vendors Went to NCC for Exposure

By **Lois Paul**
CW Staff

CHICAGO — Although most agree that this year's National Computer Conference held here recently was not exactly a software show, the software vendors were largely represented for one reason: exposure.

"The results and direct benefits from the attendance at NCC are not really worth the cost," Alex Kuli, marketing manager for Cincom Systems, Inc., said. This is not to mention the fact that Cincom found itself tucked away into a less than prominent spot, on the Concourse Level of McCormick Place.

"We applied late," Kuli said, explaining the location. Don Campbell, manager of marketing communications for Cincom, noted that Cincom has not attended NCC the past two years and because of this was placed at the bottom of the list.

"Even hardware vendors, if you ask them, are saying that the reason they are showing up at NCC is competitive pressure," Kuli maintained.

Cooler Disadvantage

Pansophic Systems, Inc. was also removed from the larger exhibits this year, and Midwest regional manager John Gallagher's reaction was: "It is cooler down here, but a disadvantage. The people generally visit us last and by that time they are tired."

He added, "It is a large show, and it is hard to tell the lookers from the buyers."

Cincom's Kuli said he was pleasantly surprised that a number of the company's customers stopped by the booth. "We have gotten some pretty good leads," he said.

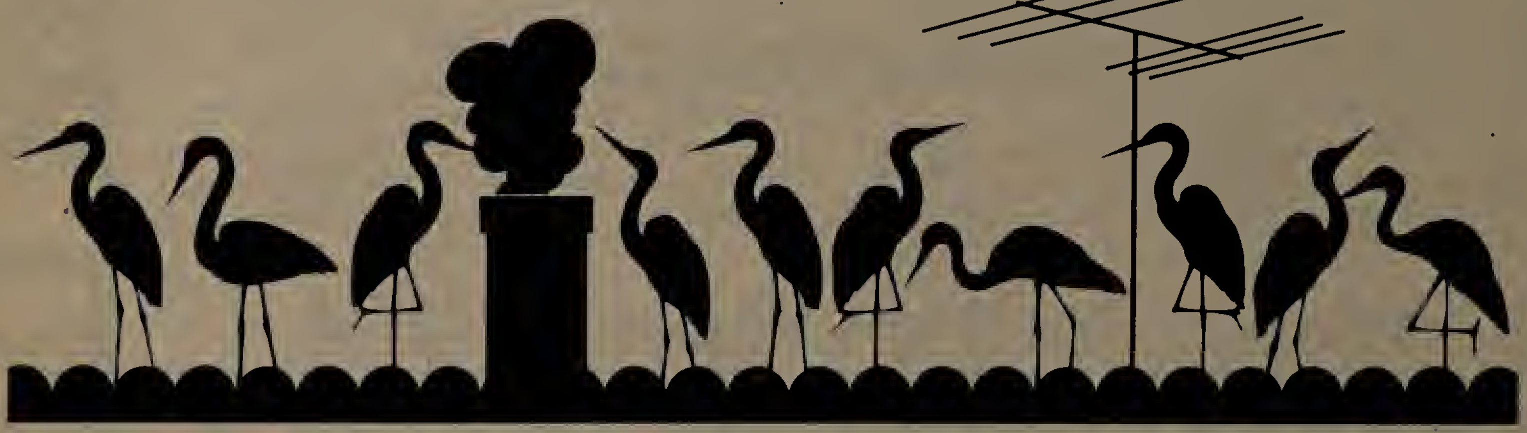
Kuli admitted he does not like trade shows and suggested that most other exhibitors probably are not thrilled with them either. "They help get your name known, but as far as producing direct sales, they are not very significant."

Cincom has not empahsized trade shows in the past. Kuli said the company will be changing that policy for the next 18 months and then will reevaluate it, based on observed results.

Dan Ross, manager of the Applications Programming Exchange/Independent Sales Organization marketing group for Burroughs Corp., admitted NCC was a hardware show, but added, "there are some software products here also."

His group is offering a program under which Burroughs contracts with software firms to market products that can interface with its own offerings. "There may be a potential at NCC for software firms looking for some sort of hookup with a vendor," Ross said. He also noted some competition in this area in surrounding booths as a reason for Burroughs' presence at NCC.

Mike Everett, account manager for Lloyd Bush & Assoc., said that some of the NCC attendees may not be attending the Software Info Show that will be held this fall. "The vendors not attending NCC could be passing up an opportunity because of this, particularly for exposure," he said.



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Software AG Reaffirms Focus

(Continued from Page 71)

on-line reports; screen paging for activity tracing; remote job entry; and control of job execution and output manipulation.

The Ababas VM option, which recently was introduced, is in the process of being extended to DOS/VSE and DOS/VS operating systems, according to the company.

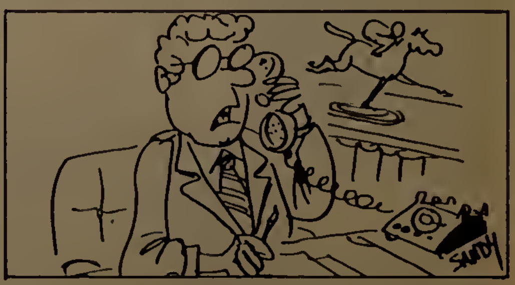
A Channel-to-Channel Communications System is being developed that is said to facilitate the physical separation of application programs for DBMS processing. This consists of a user machine communications module and a data base machine communications module.

CICS Utility

A new CICS on-line utility package called CICS-Ease was described by Software AG, which reportedly operates as a teleprocessing monitor to the terminal user and performs utilities in its own environment. It includes a text editor; on-line support of Pansophic Systems, Inc.'s Panvalet and Applied Data Research, Inc.'s Librarian packages; remote job entry; interactive spool handling; simultaneous multiple conversations; online Adabas utilities and interactive map creation.

A Natural security system being developed is said to allow the data base administration to predetermine and control access to the data. This system resides in the data dictionary and includes fine-tuning capabilities, the vendor said.

Over 900 international Software AG users were in attendance at the conference, which reportedly is a 70% increase over past meetings.



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We save your operators from discomfort. You've probably read that many CRT operators complain of eye strain, back pain and other discomforts from working on display stations that have not been "ergonomically designed." Our 2078 helps solve the problem. It's been designed with a tiltable, fingerprint-resistant screen that allows for sharper image contrast. And it's been convenience-engineered with features that help insure operator comfort, improve productivity and lessen chance for error.

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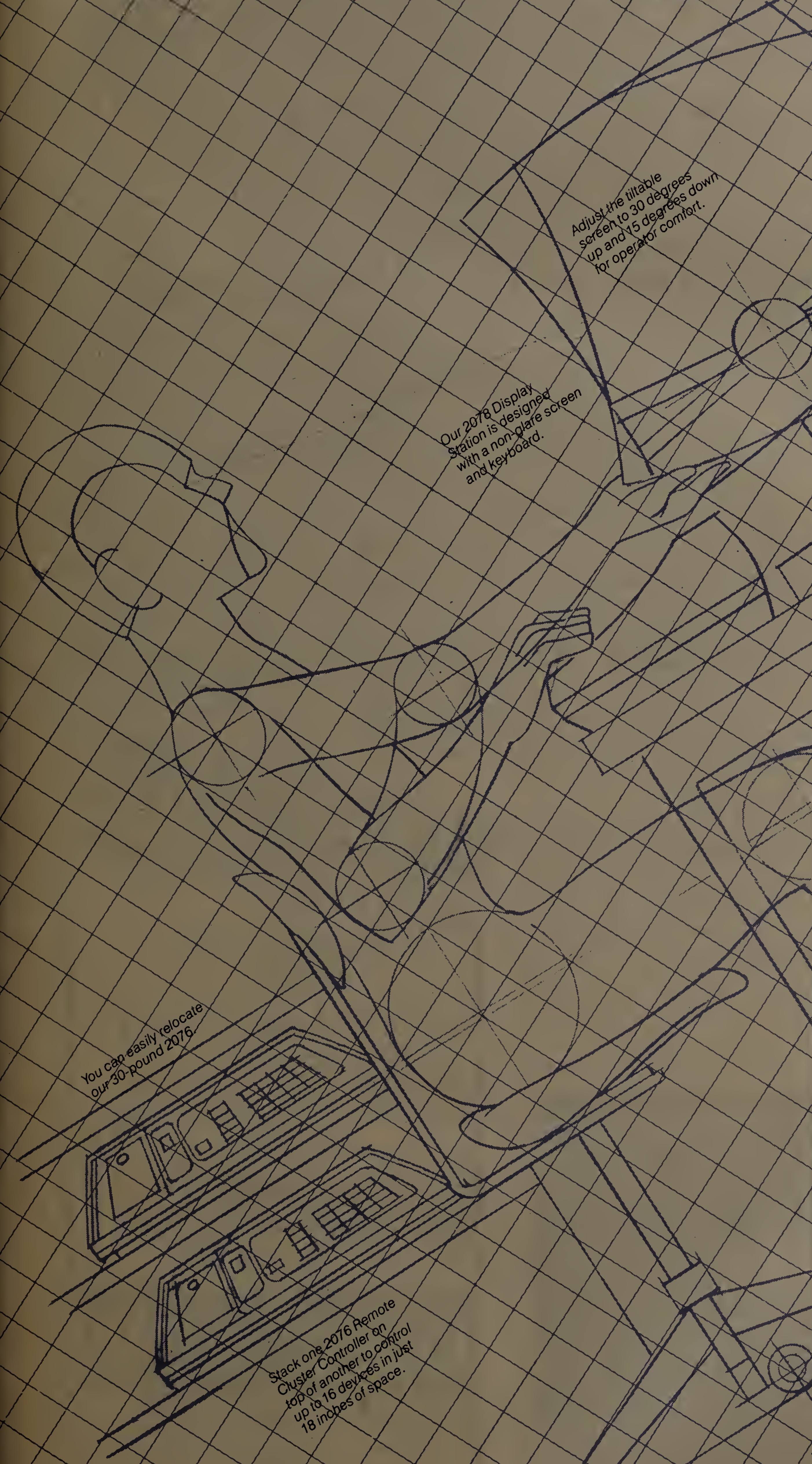
Adjust the tiltable screen to 30 degrees up and 15 degrees down for operator comfort.
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You can easily relocate our 30-pound 2076.
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Executive Corner

- Alexis Sozonoff has been appointed vice-president and general manager of Harris Corp.'s Information Systems International Division.
- Sherry Walkingstick has been appointed vice-president of finance at Strategic, Inc.
- Roy Kundiff has been named vice-president of marketing at Kurzweil Computer Products, Inc. Merton E. Kenniston has been named vice-president of manufacturing and Peter H. Hubbard has been promoted to vice-president of field service.
- Edgar J. Towers has joined Evolution Computer Systems Corp. as vice-president of international sales.
- George Stoeppel has joined Quantex Corp. as vice-president of marketing.
- Bruce C. Tomson has been named vice-president of marketing and data processing for Safeguard Business Systems, Inc.
- Jim Schenck has been appointed vice-president of sales and marketing at California Devices, Inc.
- Kenneth J. Jones has been appointed vice-president of the Systems Technology Division of the Computer Technology Group at Tymshare, Inc.
- Richard D. Dixon has joined Dest Corp. as vice-president of marketing.
- James G. Gillespie has been appointed vice-president of human resources at Zentec Corp.
- Joe B. Freeman Jr. has been named senior vice-president and chief financial officer at AM International and Jerry O. Williams has been named vice-president of corporate planning.
- John V. Okulski has been named senior vice-president of finance and chief financial officer for Software AG of North America, Inc.
- Richard W. Jahnke has joined Comsat General Telesystems, Inc. as vice-president of marketing.
- Dr. Joseph E. Rowe has been appointed vice-president and general manager of Harris Corp.'s Controls Division.
- William C. Ater has been appointed vice-president of administration for Anacomp, Inc.
- Kenneth J. Jones has been appointed vice-president of the Systems Technology Division of the Computer Technology Group at Tymshare, Inc.
- Jerry Frandrup has been named vice-president of field engineering at Northern Telecom, Inc.'s Electronic Office Systems Division.
- William E. Gaines has joined Devlin Associates, Inc. as manager of the company's Disaster Recovery Planning Services.

Hobbyists Enter Mainstream

(Continued from Page 71)

sively through retailers. Psaris claimed the company will have about 80 retailers marketing the system.

Apple's Roybal reported that his company's booth, one of the splashier at this year's NCC, got the kind of prospects it wanted at the show — small business and education users.

Apple is just starting to gear up its major accounts program. Although Apples have infiltrated some large user installations, such as the Bank of Louisville, marketing to this segment has been haphazard. Apple will now use a dedicated sales force to market to large end users, splitting a portion of the sale with its retail distributors, who will provide support and service, Roybal said.

A major factor propelling the former hobbyists into the small business arena is the availability of business application software. One of the foremost firms producing this software is Personal Software, Inc., the maker of Visicalc, which is used on a multitude of personal computer systems including Hewlett-Packard Co.'s HP 85.

The first product of the two-year-old firm was Microchess, a game.

With the introduction of Visicalc, the firm began targeting the personal-computer-as-a-workstation market. At NCC the company introduced Visiplot, a graphics package; Visitrend/Visicalc, a graphics, forecasting and statistical package; Visidex, an information indexing system; and Visiterm, a communications system that allows micros to tap into time-sharing and host systems. Packages sell for about $200 each.

Radio Shack was another micromaker that had a visible impact on the NCC floor. The company has always felt it serves other markets besides the hobbyist, one sales manager noted. With the addition of business software such as Visicalc and Profile II, a data base management system, Radio Shack is aiming to sell its TRS-80s to Fortune 500 firms as professional personal computers.

The company is seeking OEMs to distribute its products and plans to attend the next Comdex, a trade show for OEMs only.

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With 'Millions' From UK-Based Parent

Insac Software Ready to Tackle U.S. Market

By Marcia Blumenthal
CW Staff

ATLANTA — Just a little more than a year after Insac acquired Altergo Software, Inc., the renamed company — Insac Software, Inc. here — is ready to tackle the U.S. market.

The UK-based parent firm has pumped "millions" into the company, providing "what it will take to go after segments of the U.S. software market," noted Craig Wilson, director of marketing for the reorganized firm.

The founding parent firm, UK-based Altergo, established a separate company in the U.S. in 1977 to get its Shadow II teleprocessing monitor into the mainstream of the U.S. market. However, the parent company was not interested in diversifying its product line in the U.S., preferring instead to concentrate its marketing effort in Europe, according to Joseph Ganem, company president.

As a result, Altergo was growing at about 15% to 20% a year, about half the rate of fledgling software firms with recognized products.

Since being acquired in March 1980, Insac has acquired a new product, CPG, a high-level development tool for writing teleprocessing applications programs. Using CPG, a teleprocessing application can be developed with 5K to 6K of code compared with the 20K of code required for a typical TP application written in Cobol, Ganem maintained.

Programmers writing TP applications typically have six years' experience in a CICS environment, but with CPG, extensive TP experience is not required, Ganem said.

Prime market targets for this product are users of IBM System/3, System/34 and System/38 who are converting to 4331s. These users need to run programs written for System/3's CCT TP system on the 4331 and IBM does not supply such a conversion product, Ganem maintained.

CPG and RPG code have a great many similarities, he added. The CPG product has already brought in more than $1 million in revenues.

This year Insac will bring out at least one more product, an application development tool for batch systems, offering essentially the same economy as CPG, Wilson noted.

Since the acquisition, Insac has consolidated its headquarters in Atlanta and doubled the size of its sales force. When acquired, the firm's sales stood at the $3 million to $4 million mark.

Ganem estimated revenues for the current fiscal year in the $5 million to $6 million range.

Rolm Creates Office Division

SANTA CLARA, Calif. — Rolm Corp. announced that its Telecommunications Division has been reorganized into two product divisions, including the new Office Systems Division.

The new office division was formed to develop and produce products for office automation, providing users with integrated voice and data information systems, and will be headed by James M. Kasson, former vice-president of engineering of the Telecommunications Division, the company said.

The Telecommunications Division will continue in the development and production of computerized business telephone systems and will be headed by Wayne Mehl, former telecommunications manufacturing manager, the company reported.

Rolm Corp. is at 4900 Old Ironsides Drive, Santa Clara, Calif. 95050.

Route To Better CICS Performance

1970- Your financial applications are now batch computerized

1975- You begin to implement online applications on a test basis using CICS 1.1 with 10 terminals.

1976- Convert to CICS 1.2 Now have production system with 12 terminals. Looking for more CICS applications and systems programmers

1977- CICS now has two production systems and 20 terminals Plan for 40 terminals in 1978 Looking for people Convert to CICS 1.3
—Notice ads from Candle on something called OMEGAMON

1978- CICS production system now at 60 terminals Management concern for better availability of online system Predict 100 terminals for 1978 Start to hear good things about Candle's MVS monitor OMEGAMON

1979- Convert to CICS 1.4 Production now at 120 terminals Estimate 160 terminals for 1980 Management concern about response time. Start looking for CICS performance people. Hear rumor that OMEGAMON is even being used in Poughkeepsie

1980- Spring—order CICS 1.5 Report from Candle. Difficult to find CICS performance people

1980- Summer—Impossible to find any CICS performance people Response time getting worse. Start getting Candle Computer Report Rumor that Candle will introduce a CICS performance monitor.

1980- Fall—Now up to 180 production terminals. Major response time problems—and management wants to go to 250 terminals by summer 1981 Impossible to find any CICS people applications, systems programming, or performance Hear of Candle's new OMEGAMON/CICS Concern that it will take too much time to be useful. Can't spare the time to investigate.

1981- CICS response time is still bad User complaints are now a fact of life. Given up looking for more CICS people. Rumor that CICS systems programmers going to what they think will be a less "pressured" shop. Develop contingency plan—"Data entry staff will put up CICS 1.5 with MRO"

1981- See this ad Learn that OMEGAMON/CICS can be installed and useful in half an hour. Skeptical—figure really takes two weeks to install. Nevertheless, figure the 30-day trial is worth $100 plus some evaluation time—if there's a chance OMEGAMON/CICS can help. Order a 30-day trial of OMEGAMON/CICS and the response time analyzer (RTA/CICS) from Candle

Monday- Receive trial package at 9:00 a.m. Read installation section Learn that CICS transaction name must be put into CICS table Figure no problem—can use existing spare names
9:10—Type in JCL to unload tape
9:20—Unload tape.
9:30—Start OMEGAMON/CICS on test CICS system as a transaction. Works o.k. Test system is boring—not much activity
11:00—Try OMEGAMON/CICS on a dedicated CRT on test system Works o.k. Like automatic updating of screen (EXCP) and lack of vulnerability to CICS problems.
2:00—Candle calls to check that installation went o.k. Minor questions about product Schedule a telephone walkthrough for Wednesday 3:00 — Still recovering from shock of having a vendor follow up so fast Make plans to try OMEGAMON/CICS on Tuesday on production system

Tuesday- Try OMEGAMON/CICS on production system. Use "CXSY" command to display basic exceptions See some VSAM string problems and short on storage conditions. Wonder how important those problems actually were Use "CTR" command to plot transaction rate—could be useful for operators to get "feel" for good or "normal" CICS activity. Prepare staff for Candle's walkthrough on OMEGAMON/CICS on Wednesday

Wednesday Morning- Meet in conference room with a CICS CRT and a speaker phone. Candle explains basic functions—shows how to use "MDEX" command to analyze problems in CICS transactions—fantastic! See that major transactions were indeed waiting a long time on VSAM strings. And the problem is so easy to fix—just increase the number of strings! See problems in applications that were written back in 1976 Wow—for four years all these transactions were suffering from the same problem!

Wednesday After Lunch- Discuss results of OMEGAMON/CICS—good reaction. Ask the guys what they thought of RTA/CICS for CICS response time—I figured that we get it from PAII at the end of the day anyway Systems programmer points out that if he knew which transactions were having bad response then he could use the MDEX diagnosis to analyze them while they were still having the problem. Sounds logical With PAII he couldn't go back and figure out why response was slow

Thursday- Talk to Candle Learn that CICS 1.5 is already supported Request RTA/CICS trial.

Two weeks later- Positive results from OMEGAMON/CICS and RTA/CICS. Prepare justifications. Consider savings impact of bad response and salary of unobtainable CICS staff. Conclude that products will pay for themselves in 4 to 6 months.

One month later- Send two CICS staff to Candle's course on OMEGAMON/CICS for more intensive training

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Under OEM Pact

ACT Marketing IDM 500 Data Base Machine

By **Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Billed as an economical alternative to software-based data base management systems (DBMS), the relational data base machine announced last year by Britton-Lee, Inc. [CW, March 24, 1980] is now being aggressively marketed here by Advanced Computer Techniques, Inc. (ACT) under an OEM agreement.

ACT said it hopes to gain early acceptance for the Intelligent Database Machine (IDM) 500 in the defense and intelligence communities as a first step to wider market penetration. First deliveries of the machine from Britton-Lee were in late February.

Non-OEM Mart

ACT will provide interface software and support for the non-OEM market, according to Richard Caplan, manager of business development of the company's Washington, D.C. office.

Caplan said the IDM 500 can be configured with any system, although some — such as Digital Equipment Corp. systems, to which the IDM 500 can be directly cabled — accept the machine more readily than others.

The processor is well suited to the VAX environment and has been operated successfully with Datapoint Corp. and IBM Series 1 machines, according to ACT. Larger IBM and Sperry Univac systems can accept the IDM 500 if interfaced through a minicomputer — the Series 1 and Varian machines respectively — with no performance degradation, according to Caplan. Hewlett-Packard Co. and Control Data Corp. users are also interested, he said.

Although ACT hopes to sell to installations wanting to upgrade DBMS by offloading data base processing onto the IDM 500, Caplan predicted the machine will catch on more readily as a data base companion to minicomputers in decentralized systems rather than in large mainframe environments.

First announced last year, the IDM 500 has a maximum data capacity of 32G bytes and a process rate of two to five transactions per second that can be upgraded to 10 to 25 per second with an optional data base accelerator [CW, March 24, 1980].

Up to four SMD disk controllers can be included with each IDM 500 to support up to 16 disk drives, allowing the processor to operate with an intelligent terminal independent of a host CPU. Terminal interfaces are RS-232 and IEEE 488 Bus.

Offloading DBMS

Discussing the advantages of offloading DBMS operations, Dr. Robert Epstein, Britton-Lee vice-president of product development, noted data base machines such as the IDM 500 are host-independent, can support multiple dissimilar hosts, are speed-independent of the host and allow easier migration to new hosts, all at a relatively low cost while freeing CPUs for other operations.

Epstein argued the IDM 500 outperforms minicomputers used as back-end DBMS machines because the Britton-Lee machine is custom-designed for relational data base processing and has a large virtual memory with no paging requirements.

Epstein said Britton-Lee hopes to have benchmark results from end users in the near future to back up its claims about IDM 500 performance.

According to ACT's Caplan, typical IDM 500 configurations will cost between $75,000 and $125,000 for hardware, with software costs running from 50% to 70% of the hardware bill. Delivery time is about two weeks, he said, estimating most interface software can be developed within three to four months.

"All the software, with the exception of Unix environment software on the [DEC] 1170, is going to be custom-made," he said. ACT has software designs for other environments, but will not develop them until orders are received, he added.

"For many of these systems, like Total from Cincom Systems, Inc., we can write an interface that allows the Total program to act upon the data base as though it were hierarchical, even though it isn't," he said. "Therefore, the existing programs that are written in Total, for example, could continue to run in parallel with new programs that are purely relational in their data management."

More information is available from ACT, 1501 Wilson Blvd., Arlington, Va. 22209.

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Orders & Installations

The Organization for Industrial Research (OIR) and Computervision Corp. have received a contract from Brown and Sharp Manufacturing Co. to install a computer-aided process planning system with pictorial capabilities at the company's North Kingston, R.I., Machine Tool Division. The new system incorporates OIR's Miplan software and Computervision's Designer IV Interactive Graphics Designer System hardware.

TSD Display Products, Inc., a subsidiary of Megadata Corp., has received an additional order for TST-40 touch screen terminals from A.R. Shaw, Inc. of Bloomington, Minn. The contract brings the total of this order to more than $250,000.

Datapoint Corp. has reported that 12 orders and letters of intent for its Information Switching Exchange (ISX) system have been signed to date. The aggregate value of the orders placed with Datapoint is in excess of $11 million.

The American Express International Banking Corp. has signed a three-year, $2.3 million contract with Time Sharing Resources, Inc. in a move to expand the capacity of the bank's global management information system.

Recent orders at Sperry Univac include two for the Univac 1100/60 system from Fedco, Inc. of Southern California and Savin Engineering and Manufacturing, Inc. in Johnson City, N.Y.; and 12 requests for the System 80 computer from such companies as the Louisville Bedding Co. of Louisville, Ky., the City of Margate, Fla., Charles County, Md., Fayetteville, N.C., police department, Chicago Medical Equipment Co. of Northbrook, Ill., Room and Board, Inc. of Minneapolis, the Waco Independent School District of Waco, Texas, and Guerlain S.A. of Paris.

Arizona State University's College of Engineering and Applied Sciences has installed a Honeywell, Inc. Multics Model 68/80 computer system valued at about $1.3 million.

Contracts

Tymshare, Inc. has announced the signing of a contract with Matra, a major French manufacturer of telecommunications equipment, for purchase of 100,000 Matra personal computer terminals.

Wang Laboratories, Inc. has selected Data Printer Corp.'s Model 3121 band printer over four other competitors in the awarding of a $10 million, six-year contract.

Dialcom, Inc. has been awarded the largest government contract for electronic mail ever awarded under competitive procurement, according to the vendor. This contract will provide the Science and Education Administration of the U.S. Department of Agriculture with 300 electronic "mailboxes."

New World Computer Co. has reported that Nelma Electronics of Toronto has ordered in excess of $1 million worth of the company's Mikro-Disc memory units and has agreed to become the exclusive distributor for New World Computer's disk product in Canada.

Quest, Inc. has received a software contract from Digital Scientific Corp. (DSC) for application and system software to be used on DSC's soon-to-be-announced small business computer system. Quest will provide source language program generators and accounting applications.

Planning Research Corp. has received a three-year, $3.25 million contract to design an automated cartographic data manipulation system for the Defense Mapping Agency.

Three contract awards totaling $2 million have been received by Anadex Inc. for DP-9500 series dot-matrix printers. Companies to be receiving the printers are Zilog, Inc. of Cupertino, Calif., California Computer Products, Inc. of Anaheim, Calif., and Plessey Peripheral Systems, Inc. of Irvine, Calif.

Micropolis Corp. has received an additional order from Commodore Business Machines, Inc. for 5½-in. floppy disk drives valued at more than $7 million.

Raytheon Co. has received a $4.4 million contract from IBM's Federal System Division to manufacture electronic circuit modules for use in computer-based sonar systems.

Alanthus Data Communications Corp. has received a $14 million contract from Cylix Communications Network to lease and service a combination modem and protocol converter (VSM) which will be supplied by M/A-COM's Digital Communications Corp.

Cincom Systems, Inc. has entered a new agreement with CyCare Systems which extends an existing contract to build applications systems using Honeywell Level 6 Total, Cincom's data base management system. The new agreement also extends the offerings of Minicomputer Total from 41 copies to 301 copies.

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User Attitudes Changing, Service Vendors Told

PALO ALTO, Calif. — Changing attitudes among users in the computer services industry will call for radical responses from vendors, according to Input, Inc., the California-based market analyst.

In its annual report on the computer services industry, 1980-1985, Input said the drive toward integrated services means single strong products are no longer sufficient to grab a respectable slice of the market.

Rather, the ultimate winners will be solution-oriented, specialized product and services vendors able to offer the user quality services that solve a complete problem such as accounting. "Product/service specialization is becoming more and more important. Users perceive that specialized offerings are 'better' than generic offerings," the report said.

According to Input, the computer services market will grow at 20% a year over the next five years to reach $35 billion by 1985, compared with the current market value of $14 billion. This is even faster than the 16% growth rate that occurred over the last decade, with the market worth only $3 billion in 1970.

"The importance of specialized products and services cannot be overemphasized. More than 80% of the growth in processing services will be of a specialized nature, and so specialization by product, service and/or marketing capability is an essential ingredient to compete effectively in the marketplace," it said.

New Opportunities

The report said there are new opportunities emerging for service vendors to process message, image, voice and video data. Users want integrated networks. Therefore, offering just a data-only network will not be a long-term winning strategy. "More computer service companies are offering user-site hardware services. As this occurs, and as computer manufacturers increase the software and services components of their sales, a blurring of the roles of vendors continues."

Input claimed that vendors must also prepare a response for users' movement toward in-house "timesharing." One approach involves creating and selling users highly specialized solutions. Although it necessitates substantial front-end investment to develop the applications, it promises high yields in the long run.

The report said that opportunities in the software product markets remain excellent and will increase by $2.1 billion between 1980 and 1985. Within this area, the discrete manufacturing sector provides the major set of opportunities for services because of a high level of on-line data base usage and a significant amount of customized software development via professional services contracts.

Factors that could accelerate market growth include:

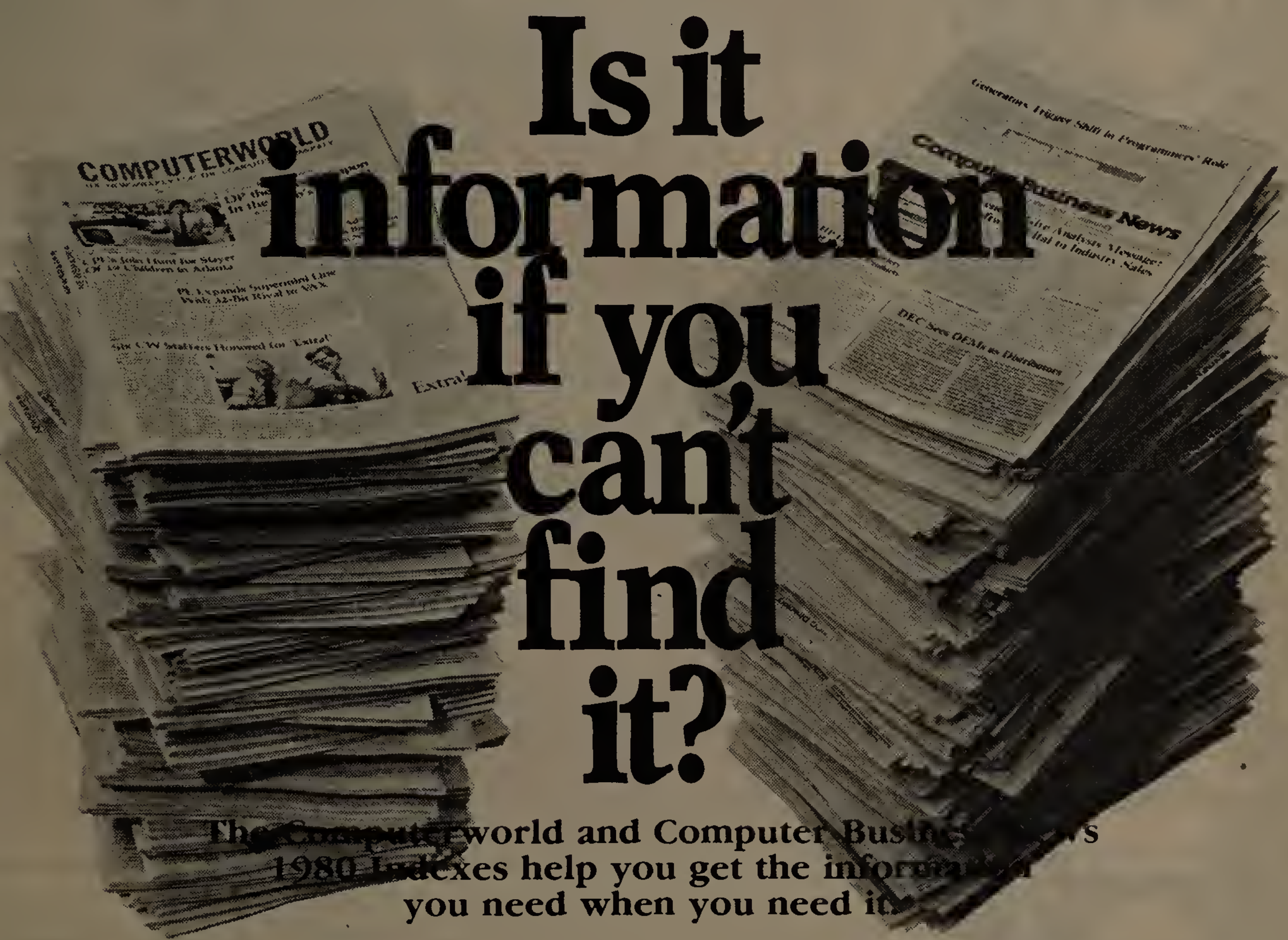
- Further software unbundling by the manufacturers.
- Continued shortage of skilled in-house DP personnel, creating pressure for users to purchase services.
- More rapid user acceptance of processing services that are based on combinations of computers at the customers' sites, networks and central computers — for example, components of products and services offered by computer services, user-site hardware services and so on.
- Creation and user acceptance of more on-line data bases.

The report argued that proprietary data bases are an important key to new business opportunities and usage is growing rapidly. "The limits on growth appear to be imagination (new types of data bases), costs of on-line storage and the difficulties of automating very large sets of information. The advent and implementation of video disks will affect the storage cost problem, while imaging systems will impact the automation problem," the report added.

Input said transnational data bases also present a major opportunity to vendors that have international market coverage, particularly in the Western European computer services market, which is now about 60% of the size of the U.S. market, compared to 35% in 1974.

According to Input's analysis: "The gap in market size between the geographic areas will continue to close during the 1980s. The Western European market is behind the U.S. in processing services, but is moving ahead in some areas of telecommunications and consumer computing."

Input continued to expect IBM to provide computer processing services during this decade with "enhanced computer hardware" offerings. In addition, Digital Equipment Corp., IBM and other manufacturers are expected to continue their systems and application software development investments.



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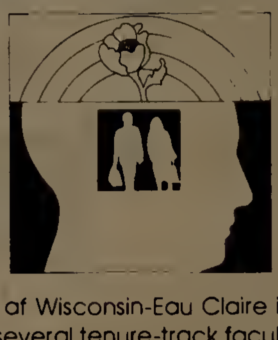

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BSEE with five years experience in digital computer design. Prior knowledge of microprocessor design helpful.

SOFTWARE SECTION LEADER

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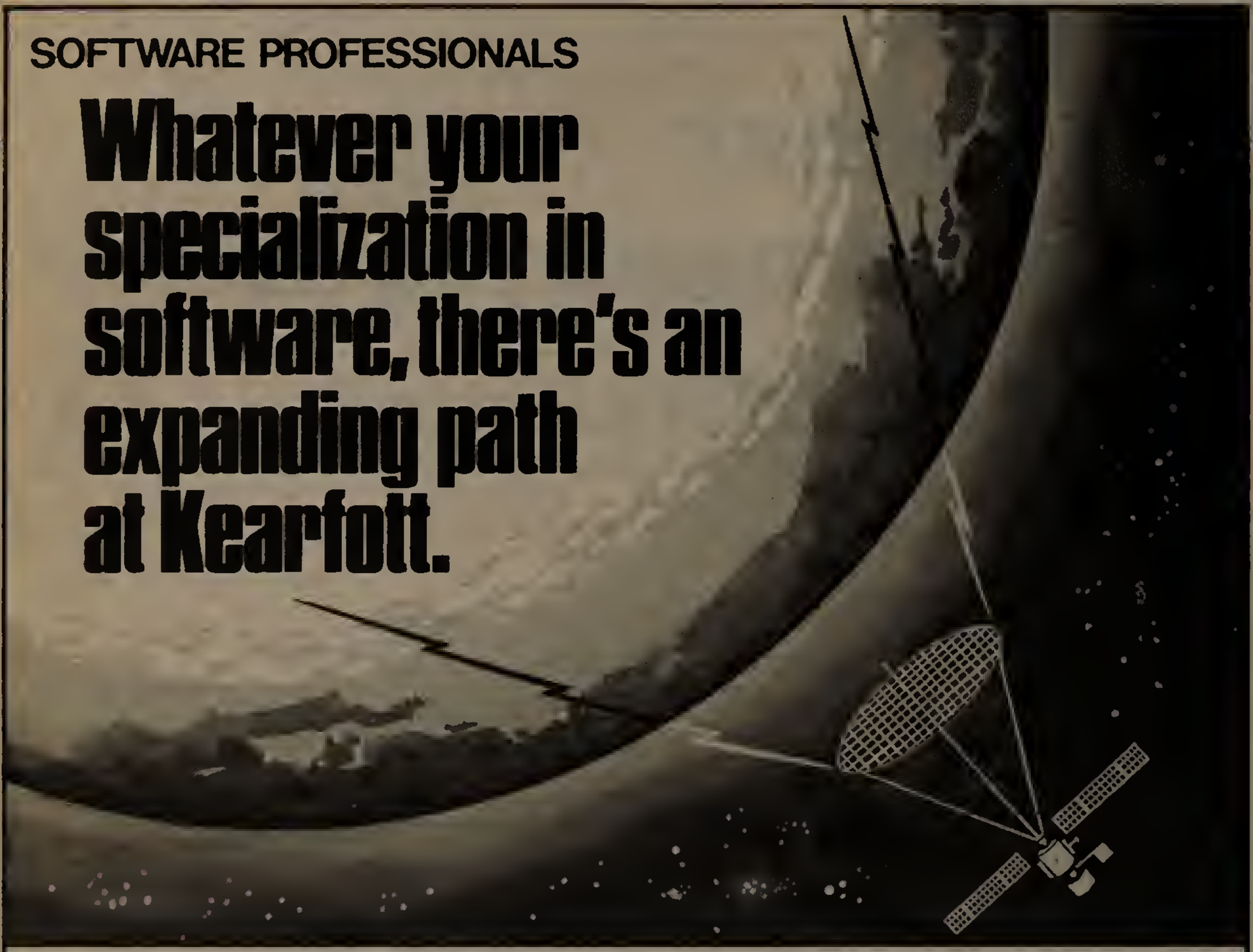
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NCR is building more functionality, more feature capability, into its overall total systems—and making them more "user-friendly" and forgiving to use. Our major software efforts in San Diego are focused on two operating systems that help accomplish this: the Virtual Resource Executive and the Interactive Resource Executive.

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With NCR Systems Engineering in Scripps Ranch...

You'll be helping shape a whole new generation of interactive, transaction-oriented distributive processing systems. Our recently created Systems Engineering Group embodies a whole new approach to software development for NCR's top-of-line mainframes. You'll work with advanced VLSI capabilities, and with mainframes that represent a quantum leap beyond any that NCR has marketed before. You'll use new concepts in data communications and PASCAL-based languages, and have opportunities to make significant advances in systems architecture, performance, data base management design, and user programming ease.

Immediate openings are for:

Software Architects

You will participate in planning and specification of advanced operating systems architecture including high level interfaces, layered structuring and certifiable security. Responsibilities will include technical guidance and leadership in the development of medium and large scale interactive software systems involving product management and architectural services. You will be involved in designing the functionality, the architecture and the protocols for distributed data processing systems. Background should include an advanced degree in CS or equivalent and 6 or more years of system design/development experience.

Secure Operating Systems Specialist

Participate in planning and specification of advanced OS architecture. Requires in-depth knowledge of one or more state-of-the-art operating systems. Focus will be on high level interfaces, layered structuring and certifiable security. Advanced degree in CS or equivalent and 6 or more years of operating system design experience are desirable.

Performance Measurement Analyst

You will measure and analyze the performance of a major software system as well as design a software performance monitor and synthetic benchmarks. Essential is a BSCS or BSEE plus 1-3 years background in operating systems development. Experience in performance measurement preferred.

Configuration Management/ Testware Development Analyst

Assignments are divided into three specializations: Software Integration, Firmware/Testware Integration and Testware. SW/FW integration (product test) activities involve functional specification review, test bed development with microcode integration and test result monitoring/evaluation. Testware (product development) deals with diagnostic program development for mainframes and peripherals. A BSCS degree is required for the above specializations. In addition your background should include experience with COBOL, PASCAL, microcode and Assembly language programming.

Systems Evaluation Analyst

You will participate in definition and evaluation of new operating systems and data base products for interactive business computer systems. Assignments include contributing to product specification, system test bed design and development, and system testing and evaluation. You should have systems applications programming experience with BSCS degree or equivalent.

With NCR Engineering & Manufacturing in Rancho Bernardo...

You'll find the stimulation inherent in creating a new generation of medium and large-scale mainframe systems, and helping develop the most ambitious systems ever undertaken by NCR. You will be working with top professionals who are showing the way in advanced system architecture, virtual systems capabilities, multiprocessing, data base management, firmware emulation, advanced circuit technology, and user anticipation. In short, you'll be shaping total systems that meet the needs of the future in one or more of the following project areas:

Software Systems Development

- Interactive Virtual Systems Development
- Performance Evaluation
- Distributed Local Architecture Systems Development
- Telecommunications Systems Development
- Operating Systems Development
- Multi-processor Systems Development
- Firmware Emulator and Architecture Development
- VRX OS Development and Support
- Software Tools Development and Support
- Transaction Processing Systems Development

Firmware Development

- Design machine emulators and virtual machine interpreters
- System design of multiprocessor distributed logic systems
- Design/Implement Distributed Processing Systems using VLSI technology
- Systems Performance Measurement

Testware Development

- Interface with H/W, F/W, S/W designers to diagnose system H/W failures for customer engineers
- Design diagnostic O/S utilities and test programs for VLSI technology H/W

Integration Test–Software/Firmware/Testware

- Develop and execute systems integration and test plans
- Specification review/analysis and liaison with developers
- Monitor and evaluate test results

MIS Applications

- COBOL, On-Line Business Programming

For prompt consideration for any one of the positions above, send confidential resume and salary history to:
Mr. Hal Ostrander, Personnel Resources, Dept. 54G,
NCR Corporation, 16550 West Bernardo Drive,
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Requirements include 1-3 years of experience with COBOL programming in a manufacturing environment. Knowledge of CICS, VSAM, DL1 and DOS/JCL along with a Business, Math or Information Management Degree is also required. The initial assignment is in Orlando, Florida where training will take place to learn the Martin Marietta Manufacturing system. You will then join the Project Team whose goal is to install that same software in Sugarland.

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Proj Investment-Banking-CICS, COBOL, Mark IV	$35M
S/A-Arbat, Intl bank. Deg	$34M
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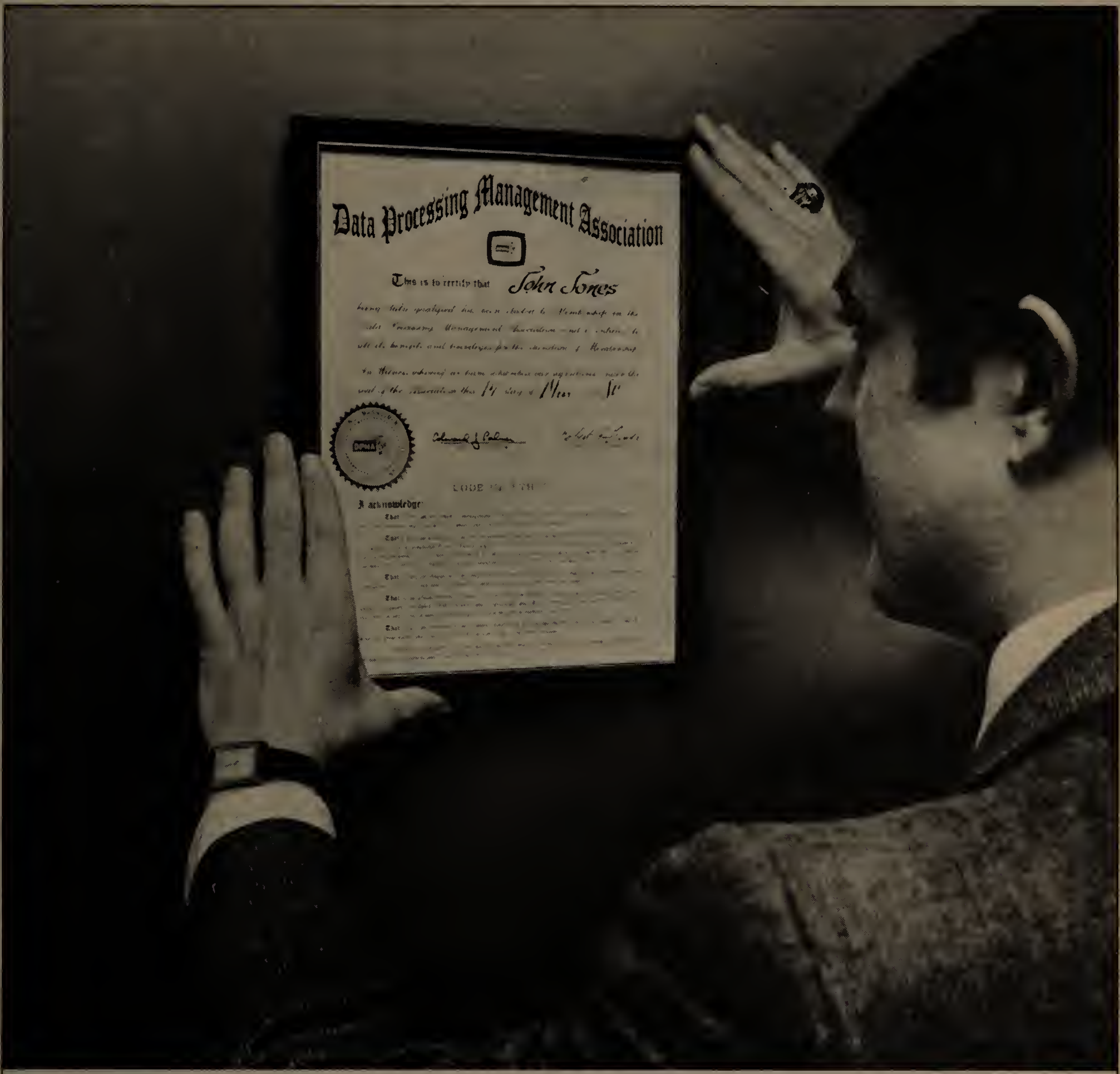
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To install and maintain DRS data base software and user data bases on PDP-11 and VAX-11 computer systems and to serve as user consultant. Must have demonstrated skills in higher programming languages, software design and development, sorting data structures, file processing, information retrieval and data base systems.

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To install and maintain the DEC operating systems RSX-11 M and VMS on PDP-11 and VAX-11 computers respectively. Must have demonstrated skills in assembler languages, higher level programming languages, sorting, data structuring, file processing, operating systems in computer architecture.

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Senior Programmer/Analyst

Helps investigate and generate solutions to problems in the fields of word processing, data management and systems design. Requires: Bachelor's degree with science or computer science major. Minimum of 2 years' programming/analysis. Major experience with at least 2 high level languages. Experience with database management systems and/or communications. Knowledge of the programming language C and the UNIX operating system an advantage. Refer to req. #36027.

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As part of a small group providing computing facilities for the faculty of arts and sciences, is responsible for a VAX 11/780 and a PDP 11/44, each running UNIX as the operating system. Requires: Bachelor's degree with emphasis on computer science. In-depth knowledge of and experience with C programming language and UNIX operating system. Experience with other high level languages. Good verbal and written communications skills combined with an organized and methodical approach to administrative matters. Ability to deal pleasantly and effectively with faculty and students. Knowledge of and experience with VAX/VMS highly desirable. Refer to req. #36028.

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For further consideration, send your resume to: Patricia Mabutas, Bechtel Power Corporation, Employment Dept. 15-7-81, P.O. Box 3965, San Francisco, CA 94119.

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This is a newly created position which is responsible for planning, organizing and supervising the data processing operations for the City. Requires graduation from an accredited college with a degree in Business or Public Administration, Computer Science or related field. Five years of progressively responsible experience in data processing activities of which three years involved supervisory responsibilities.

Applicants must submit a detailed resume and completed application to the **City of Visalia, Personnel Department, 315 S. Johnson, Visalia, California 93291, (209) 625-6204.**

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To Grow With Xerox Computer Services

Xerox Computer Services was founded in 1970 to offer solutions to the information-related problems of manufacturers, distributors, local government, utility companies and other Xerox Companies, via an international time sharing computer network. Today we are a profitable and expanding unit of Xerox, whose current needs require applicants in the following area:

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Minimum experience should include five years of progressive technical experience in the areas of computer operations, application programming, software programming, network/communications programming, data-base analysis or computer performance analysis. Prior experience in an IBM-compatible 303x environment would be a definite plus.

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The International Divison of a major West Coast Commercial Bank is searching for an organized, ambitious individual to assume overall responsibility for a medium-size computer operations center at San Francisco headquarters.

Position requires online computer console experience, preferably with IBM System 34, as well as keen communication skills.

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BankCal, The Bank of California
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San Francisco, California 94104
ATTN: Mr. Bernard Henry

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developing Data Communications, Word Processing and Microcomputer Systems at NCR/Columbia, S.C.

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• • • • • •

Send a resume and salary history or call collect (803) 796-9250. Mr. Glenn Rannick, NCR Corporation, Engineering & Manufacturing, Dept. 54Q, 3325 Platt Springs Road, West Columbia, South Carolina 29169

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DARTMOUTH COLLEGE
DIRECTOR of ACADEMIC COMPUTING

The Office of Academic Computing

The Office of Academic Computing at Dartmouth College is a new division which links the academic community with the services of the Kiewit Computation Center. The office provides a wide range of services: public terminal clusters, documentation, training, and applications packages for both on- and off-campus users. Support for word processing and microcomputers is likely in the near future. Equally important, the office is a center of ideas, identifying new forms of academic computing and publicizing their existence, working on grant proposals, importing software and exporting Dartmouth's own development.

The Director

The Director of Academic Computing will lead a team of a dozen professionals and thirty students. We are looking for candidates with a deep understanding of academic computing, both research and instruction. Ideas, enthusiasm, and the ability to work closely with faculty are essential. Technical computing expertise and management experience are clearly valuable.

Computing at Dartmouth

Dartmouth College has long been a leader in academic computing. As a result, we have what is probably the most computer-literate faculty and student body in the world. The College has a very large time-sharing system, augmented by numerous smaller machines. In the very near future, the hundreds of terminals, including screen-editing microcomputers, will be linked to these computers over the Kiewit Network, an ultra-speed, on-campus network.

Write, or call today to: Dr. William Y. Arms, Director of Computing Services, Kiewit Computation Center, Hanover, NH 03755. (603) 646-2736.

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Opportunity for D.P. Professional with relevant experience to make a significant contribution to an increasingly important and visible area

Our prominent, multi-billion dollar financial organization, located in beautiful North Central New Jersey, utilizes a highly sophisticated data base/telecommunications network, upon which we rely increasingly, for monitoring and recording all corporate activity. This newly-created function, reporting to the Assistant V.P./Director of Security, is designed for a degreed data processing professional with 3-5 years experience in associated security/protective applications. The successful candidate will undertake a variety of essential, frequently complex, assignments including:

- *Establish and develop standards and guidelines for data processing security and assist in their implementation.*
- *Establish procedures and conduct investigations concerning questionable business activities and all obvious misuse or abuse of corporate resources.*
- *Develop programs for control and positive identification of persons, devices, programs and systems processes as well as unauthorized remote job entry access to main systems (IBM OS environment).*
- *Provide periodic integrity testing; develop tape documentation for system, security classification, disaster recovery, off-hour security regulations, etc.*
- *Coordinate relevant training and awareness program for in-house personnel*

The vital importance of this function and its visibility within the highest executive levels of our organization make this position one of significant growth potential for the right individual.

Salary offered will be commensurate with experience and education.

Qualified persons are requested to send detailed resume, in strictest confidence, specifying both current and desired income information. We will contact you promptly after reviewing your qualifications to make arrangements for a personal, in-depth interview.

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DP Operations Manager

To qualify for this position, you must have proven supervisory and administrative skills (minimum of two years) in a large DP installation with a 24-hour-a-day, 7-day-a-week operational environment. UNIVAC 1100 experience and the ability to interface with all levels of management is desirable. Some telecommunications knowledge and a BS degree in computer science is preferred.

Find out more about Sperry's industry-competitive salary, comprehensive benefits package and opportunities for career growth. Send your resume and salary history, in confidence, to Jim Richter, Job Interest #CW D-24.

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APPLIED DATA RESEARCH has several openings for intermediate and senior level programming personnel. Positions involve assignments in software development for the following ADR product groups: **VOLLIE®**, **DOS/LOOK®**, **MetaCOBOL®**, **On-line ETC®**, and **The LIBRARIAN®**. These positions will also involve you in new product development.

Candidates must have a minimum of 2 years programming experience and strong IBM Assembly language skills.

APPLIED DATA RESEARCH offers a very competitive salary commensurate with your background and potential and a comprehensive benefits package which includes semi-annual bonuses and dental, prescription drug, and tuition assistance plans. In addition, ADR offers an environment uniquely suited to DP professionals. For more information please forward your resume or call Mr. Ed Smith, Director of Personnel, collect at (201) 874-3033. All inquiries held in strict confidence.

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Department CSD
Route 206 and Orchard Road, CN-8
Princeton, New Jersey 08540

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ADR

Programming/ Database Supervisor

We are looking for a committed computer professional with extensive database experience to fill this senior level supervisory position. Oversee the design & development of applications using the SPIRES dbms; contribute to SPIRES design; consult, teach & write docs. Act as senior consultant and planner on database & other tech issues.

Qualifications: degree in comp sci or related field, equiv educ & exp. Aprox 5 yrs gen computing exp (incl NYLBUR, ORVYL, IBM OS externals, JCL, FORTRAN, statistical pgms, graphics, text formatting). Strong database exp with approx 3 yrs SPIRES exp (incl analysis of user needs; design and programming of large applic; knowledge of file def, formats, protocols, system internals & design concepts). Exp serving users via consulting, teaching & writing doc. Approx 2 yrs supervision of prof staff & large projects.

Salary range: $27,000 to $36,000 dependent upon years of applicable experience.

Send resume within 30 days to:

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Development Department
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Multi-faceted opportunity for knowledgeable EDP pro. 2+ yrs ASSEMBLER programming with good knowledge of VSAM and CICS internals. Rapidly growing environment consists of 370/148 and 145 DOS VSE with PANVALET. Outstanding benefits include 4 weeks vacation and generous bonus. $37,000

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LEADERSHIP POSITION: INSTRUCTIONAL COMPUTING AT THE UNIVERSITY OF FLORIDA

The Center for Instructional and Research Computing Activities at the University of Florida is seeking a senior assistant to the Director (with the title Assistant in Computing Services), to have primary responsibility for effecting major improvements in the use of instructional computing at the University of Florida. This includes: Recommending and overseeing implementation of operational policies and procedures for (1) two VAX 11/780 computers (2) the continuing instructional use of the IBM-compatible systems provided by the Northeast Regional Data Center of the State University System (located on the University of Florida campus), and (3) support of instructional computing on microcomputers owned by individual departments. Selecting and acquiring software and "courseware" to be used for instructional computing, in close cooperation with the faculty who may be expected to utilize such software. Informing the faculty of instructional computing possibilities open to them, and educating them in the effective and efficient use of the resources available, through workshops, seminars, informal discussions, and the generation and distribution of informational literature and documentation. Managing (and reporting on) the use of available resources so as to maximize their benefit to the University and its students. Recommending and assisting in the acquisition of hardware and services for instructional computing.

The University of Florida is located in Gainesville, Florida, a very pleasant and attractive city of about 125,000 population including the surrounding unincorporated areas. The community supports a broad spectrum of cultural, sports, and other entertainment activities and is within a couple of hours' drive from the Gulf of Mexico and the Atlantic Ocean, several state parks, numerous springs, and a broad variety of commercial attractions.

A masters degree (or a baccalaureate with experience equivalent to a masters) is required. Evidence of previous leadership and management experience in academic computing is essential, as is demonstrated familiarity with instructional computing. Candidates should also document their ability and willingness to prepare written informational materials and present workshops and seminars on the utilization of computational resources.

Resumes are solicited for receipt prior to June 30 and should be sent to the chairperson of the Search Committee for this position:

Dr. Blake E. Cherrington, Chairperson
Department of Electrical Enginering
216 Larsen Hall
University of Florida
Gainesville, Florida 32611
(904) 392-0913

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SYSTEMS SOFTWARE PROGRAMMERS

Digital Communications Associates, Inc., a rapidly growing company in the data communications industry has openings in the Product Development Department for System Software Programmers. These positions involve the design and implementation of data communications software for DCA's microprocessor based network processors.

From three to six years experience in Assembly language programming are required for these positions. Microprocessor and data communications experience are a plus.

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Bill Posey

dca
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NCR Cobol, Neat	To $26K
IMS/DL1, Cobol	To $30K
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MVS, Cobol	To $23K
Bank Applications	To $26K
Hnywl Cobol, IDS	To $26K

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San Francisco Bay Area

Our client, a very large profitable organization, needs data processing professionals with the following qualifications to fill immediate openings:

- 2-4 years exp. as a Programmer/Analyst using PL/1 or IMS
- Good communication skills, professional image
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Please send your resume and salary history to Management Consultants: CW BOX 2572, 375, Cochituate Rd., Box 880, Framingham, MA 01701

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Computer Science Faculty

Undergraduate teaching position available in Computer Science for Fall 1981. Requirements: Master's Degree or above In Computer Science, strong interest in teaching, interest in aviation desirable. Recent graduates Invited to apply. Send resume In confidence to: PD-E, Embry-Riddle Aeronautical University, Regional Airport, Daytona Beach, FL 32014.

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In Saudi Arabia, Aramco is involved in dozens of incredibly large and complex projects. Probably nowhere else in the world is modern technology being employed so widely. Aramco Services Company in Houston plays a significant role in all of it. If you have the qualifications, we have the following openings now in Houston.

Systems Analysts

We're looking for an individual with a minimum of 10 years' experience in a primarily large IBM compatible environment. Proficient at technology investigations, special studies in areas like graphics, word processing, mass storage, network directions, and/or any similar emerging technologies.

We are also looking for a systems analyst with 4 years of DP experience, with at least 2 years on staff or the applications development areas. This position is administrative in nature involving budgeting, contracts, project control, and DP chargeback. There is an excellent opportunity for advancement to a supervisory role.

Data Dictionary Analyst

We need someone with a minimum of 3 years' experience in IMS, at least one of which involves data dictionary use, including data dictionary planning, standards, procedures. etc.

Data Base Analysts

A minimum of 3 years' experience is required in IMS data design for online systems. Familiarity with logical relationships and secondary indices is a must, and ADF and/or PL1 would be helpful.

Data Base Support Analysts

Required is a minimum of 2 years' experience in IMS system support, including use of BTS, IMS utilities, and DB performance and tuning tools (IMSPARS, IMSASAP, DB and DC monitors, etc.)

MVS Systems Programmer

Successful candidate will need a minimum of 7 years of systems support, including at least 3 years supporting MVS. You must also be familiar with SMP-4 and JES2. TSO support and NJE support would be helpful, as would ACF2.

General Systems Programmers

Needed is 3 years of DP experience, with at least 1 year of installing program products, managing DASD environment, troubleshooting systems problems (JCL, compilers, dumps, etc.).

Commercial Programmers

Required is 2 years of DP experience, as well as familiarity with PLI, OS/MVS, JES2, JCL, and IMS DB/DC. Some experience with systems analysis and structured techniques is required. Also experience with projects involving treasury, industrial relations and payroll areas.

We also need Commercial Programmers having a minimum of 3 years' experience, and familiarity with PLI, TSO, IMS DB/DC, OS utilities, and MARK IV/SAS. You will be responsible for developing and maintaining software in our operations, purchasing and traffic systems.

Commercial Analysts/Programmers

Required is a minimum of 3 years' experience in design, analysis and programming of commercial applications systems, and a minimum of 2 years in IMS on-line DB/DC and PL1. ADF and MARK IV experience are highly desirable.

Training Analyst

Needed is 3 years of DP experience one of which is in an EDP training-related capacity. You'll coordinate and assist in the administration of departmental training programs.

Standards & Procedures Analyst

We're looking for someone with 3 years of DP experience including systems analysis and technical writing. You'll develop standards, procedures and manuals, and conduct research and analysis to ensure quality and consistency of documents.

All positions require a BS or BA in Computer Science, Math, Business, or related field.

Send your résumé in full confidence, or write for more information to: Aramco Services Company, Section DOM, Department CW0518JC04A, 1100 Milam Building, Houston, Texas 77002.

ARAMCO/HOUSTON
SERVICES COMPANY, DOMESTIC

SUPERVISOR OF PROGRAMMER/ANALYSTS

Indiana General, a manufacturer of magnetic materials located in Valparaiso, Indiana, has an immediate opening for a Supervisor of Programmer/Analysts.

Responsibilities of the position include system studies, project planning, technical interface with hardware and software vendors, and supervision of programmers and analysts.

Applicable experience should include financial and manufacturing systems, documentation/standards, and distributed systems concepts using IBM, Univac or HP Systems. A degree in business administration, IE, IM or accounting is preferred.

The position reports to the Manager of Data Processing and offers a competitive compensation package including a full range of fringe benefits. Please submit your resume including salary history to:

Division Personnel Office
Indiana General
405 Elm Street
Valparaiso, IN 46383

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Assistant Director for User Services
Colorado School of Mines Golden, Colorado

Duties & Responsibilities:
Assist students and faculty in making effective use of computer resources in instruction and research. Position involves managing a small group of professionals providing consulting to faculty and students concerning software problems, conducting user training seminars, and maintaining computer program libraries and related user documentation. The person selected for this position will report to the Director of the Computing Center. Additional appointment as a faculty member in an Academic Department is available.

Qualifications:
Possession of an advanced degree required in Engineering, Math, Science or closely related field. Background in FORTRAN applications required.

Experience:
Preferably two or more years of academic experience. Knowledge of interactive computing utilizing a timesharing system (DECsystem-10 helpful). Demonstrated experience managing a small group of technical staff within an academic computer center desired. Data base management experience would be helpful but not essential.

University Computing Equipment:
DECsystem-1091, DECsystem 2020.

This is a 12 month position. Salary based on experience and qualifications. Position available July 15, 1981. Please send resume in confidence to Dr. Michael B. McGrath, Computing Center Director, Colorado School of Mines, Golden, CO 80401. Application deadline is June 5, 1981.

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Programming Instructors
San Francisco

Bank of America needs in-house DP Instructors of various levels for its Electronic Banking Division. You must have COBOL experience and teaching skills.

You will also have the opportunity to be trained in and to teach 370/OS JCL, ALC, structured techniques, TSO, IMS and other technical subjects.

Please send your resume in confidence to Dept. 3442, Bank of America, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer.

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Data Processing

DATA BASE SOFTWARE SPECIALISTS EXCEL AT CF&I

CF&I Steel Corporation is in immediate need of a Data Base Software Specialist possessing a degree in Computer Science, related field, or with equivalent years experience. The successful candidate will have approximately two years experience in the generation and modification of operating systems software and the internal design of interactive on-line systems.

Major responsibilities will be to install new and updated versions of software packages, interface hardware specifications with software and application requirements, plan, design, and implement data communication systems facilities, work with end users of those facilities, and monitor operating systems performance and problem change requirements.

Experience with following systems desirable: VM/CMS, DOS/VSE, CICS, DL/1, IBM System 370 and experience with IBM 3270 type peripherals a must.

If you are qualified and seek a challenging opportunity with growth potential, excellent salary and steel industry benefit package, please submit your detailed resume, including salary history and requirements in confidence to: **P.A. Arriaga, CF&I Steel Corporation, Dept. CW258, P.O. Box 316, Pueblo, Colorado 81002.** We are an equal opportunity employer m/f.

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Data Processing

GESCO is a computer service and software development company that services the financial industry. The system includes multi-large scale IBM host computers, a telecommunication network of approximately 4000 terminals and mini-computers encompassing 375 locations in four states. It has experienced continuous growth in a rapidly expanding client base and, thus, offers an exciting technical environment. GESCO's environment places a high value on its professionals and, therefore, many unique benefits are provided. Due to the rapid growth experienced by the company, the following positions are available:

SYSTEMS PROGRAMMER:

Requires minimum 2 or more years operational systems experience with IBM OS/VSI (moving to MVS) on large scale multi-processor systems. Responsibilities include systems generation, performance measurement, tuning and telecommunications support. Experience with BAL, BTAM, VTAM, NCP/EP, ACF/VTAM, JCL, and MVS is perferred.

SYSTEMS ANALYST

Position requires 3 or more years experience in applications analysis and programming in a financial environment. Responsibilities include systems analysis and design, program specifications, project management, user interaction and system documentation. Good communications, interpersonal skills and use of structured techniques essential.

NETWORK TECHNICIAN

Position requires 2 or more years experience in performing the operational tasks related to running and controlling a telecommunications system. Knowledge or experience with DDD/WATS, 4 wire, network trouble shooting and bell system modems are preferred. Good written and verbal communication skills are essential.

Please send resume with salary history to President, GESCO Corporation, 3747 E. Shields Ave., Fresno, California 93726.

GESCO corporation

An Equal Opportunity Employer M/F

MIS MANAGERS

Motorola, an innovative leader in the electronics industry, has immediate opportunities available at its Ft. Lauderdale, Florida facility for:

MANAGER OF TECHNICAL SUPPORT

Will provide technical expertise to our MIS/Computer operations staff and our user community. Interface and coordinate with all levels of management, users and the department staff to explain and resolve various data processing related problems. Provide guidance and review 2 or more Programmer Analysts. Plan, set goals and follow through to insure that plans & goals are met in a timely and efficient manner.

Must have thorough knowledge of COBOL and IMS and experience on IBM equipment in a manufacturing environment. Good written and oral communication skills and the ability to work flexible/additional hours under pressure are required. Any additional knowledge of OS, DOS/VSE, CICS/ICCF, JES, POWER and RPG II is a plus.

MANAGER OF BUSINESS SYTEMS

Will be responsible for planning and organizing feasibility studies and system designs, coordinating the activities of the Systems Analysts, Operations personnel and user departments, and assigning Systems personnel to tasks. Regularly review the progress of projects and report status of the projects to management, and review personnel performance for the purpose of salary administration, training and promotion. Will keep abreast of new techniques, software and hardware that would enhance existing or proposed sytems, and provide technical guidance to individuals reporting to this position.

Must have thorough knowledge of manufacturing, cost and quality control systems such as: material scheduling, requirement planning, work in process, stockroom inventory, bill of materials and routing. Must be able to read, understand and evaluate COBOL code and have exposure to an IMS environment. Good interpersonal relations and communication skills are required. Ability to make decisions during highly critical and crisis situations needed.

For a dynamic lifestyle and career, explore these opportunities at Motorola. Send your letter or resume in complete confidence to:

Professional Staffing, Dept. CW 518
MOTOROLA INC.
Communications Portable Products Division
8000 West Sunrise Blvd.
Ft. Lauderdale, FL 33322

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MOTOROLA INC.

PROGRAMMER/ SYSTEMS ANALYSTS

SW & No. Cent. Locations

Are you interested in professional development, personal recognition, and a good salary combined with an excellent benefits package? If so, consider joining our client, a multi-plant operation with more than $50 MM in sales.

Company is a recognized leader in the computer graphics field and is currently seeking dynamic, results-oriented D.P. professionals with computerized composition experience.

If your background includes 4+ years of programming and/or systems development with a strong knowledge of text handling, let us hear from you.

We seek results oriented professionals who thrive on challenge. For confidential consideration, please call or submit resume to: Gene Farrell

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Executive Search
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Media, PA 19063
215-565-0800

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Wallingford, PA 19086

215-565-2920

Systems Personnel Inc.
MEMBER OF NATIONAL COMPUTER ASSOCIATES

Data Processing Operations Professionals

Our client, a major financial institution based in San Francisco, has engaged us to find a number of HDP Operations Professionals. All of the positions offer excellent compensation.

State-of-the-Art IBM 370/158, 168 or 3033MVS, IMS, INTERCOMM, TSO skills are required. Management, supervisory and technical positions are available in Computer Processing, Operations Support and Telecommunications Center.

We are consultants to management. If you can meet the challenge of a multi CPU MVS environment send a detailed reume and salary history to **Dept. DPI, CW Box 2570, 375 Cochituate Rd., Box 880, Framingham, MA. 01701.**

Employer assumes fee

COMPUTER PROGRAMMERS

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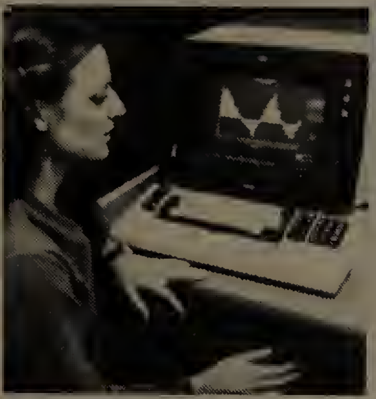

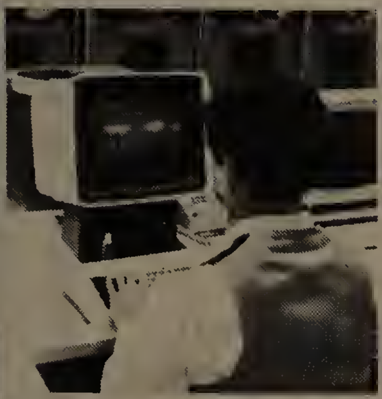

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Because of our dynamic business growth, we are experiencing dynamic systems growth.

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These are outstanding growth opportunities at our international DP center in Wilton, Connecticut for individuals capable of taking the lead and innovating. Individuals who aren't afraid of a challenge. Individuals like you.

APPLICATIONS PROGRAMMER/ANALYSTS

At least 1 year programming experience in IBM Assembler required

Tracking and Tracing·Enhance and upgrade worldwide real-time system. Experience with direct access files desirable.

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General software and systems support. Requires 2 years programming experience in BAL. Mini experience with Series/1 RPS and CM preferred for some of these openings.

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- IBM Color Graphics
- IBM Series/1
- IBM System 7
- Individual programmer terminals (VM/CMS)

Our Software

- CCAP-on-line operating system, enhanced and maintained internally
- DOS/VS
- VM/CMS
- OS (MVS/SNA)-Lab environment

Emery's concern with achievement and excellence is evidenced by our policy of competitive salaries and liberal benefits including full relocation assistance.

For further information, send your resume or a letter with salary requirements to: Emery Air Freight, Employment Department CW, Wilton, CT 06897. Or if you prefer, call us to speak with one of our Computer Professionals. In Washington call: (202) 289-8281; in Boston call: (617) 536-8988; in Connecticut (and all other states) call: (203) 834-3201.

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SENIOR SOFTWARE ENGINEER

(MEDICAL RESEARCH)

WYETH LABORATORIES, a leading pharmaceutical firm, has an opening for a Senior Software Engineer to work in support of developing new drugs. This position is now available with our Scientific Computer Applications Division In Radnor, a highly attractive Main-Line Suburb of Philadelphia.

Responsibilities of this position will emphasize consulting with staff personnel about difficult technical problems, as well as maintaining and trouble-shooting selected computer software. Activities will also include developing needed systems software, both for new applications and for refinements to existing systems. Applicants must be results-oriented with approximately five to ten years of experience. Demonstrated proficiency in BAL and higher-level programming languages, and computer systems analysis, is essential. A thorough knowledge of large-scale IBM equipment, including OS/MVS, TSO, JES, telecommunications, and basic hardware is also necessary.

A mathematically-oriented education (preferably Master's or doctoral level), and project leadership ability, are needed for this position. Our applications programming staff is involved in processing medical and other scientific data, with emphasis on PL/1, and there is heavy utilization of many "commercial" programming techniques relating to the organization and management of large files.

This position offers an excellent starting salary and includes an attractive package of fringe benefits. Qualified individuals are invited to apply by forwarding a resume in confidence to:

JOHN PINKERTON
Personnel Department

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Programmer Analyst

Jones Apparel Group, Inc. a leading manufacturer of better quality ladies sportswear and career apparel has an opening for a programmer analyst having a minimum of five years experience in designing, maintaining and updating programs.

A thorough working knowledge of COBOL, RPG and on-line applications in the financial and manufacturing areas is essential.

This position offers an excellent benefit package and a competitive salary. An excellent opportunity for the individual seeking a genuine challenge. Send resume to:

Gary Levesque
Jones Apparel Group, Inc.
1 Connecticut Ave.
Norwich, Conn. 06360
Equal Opportunity Employer

TRUMBULL CAMPUS

Instructor or Assistant Professor, School of Technology - (Computer Technology). This is a tenure track position in Kent State University's Regional Campuses. Qualifications: Bachelor's degree and a minimum of 3 to 5 years experience in computer technology or closely related field required. (Master's degree in appropriate field of study and demonstrated teaching skills and administrative abilities preferred.) Responsibilities include teaching, program coordinating, student advising, supervising of student employees, assisting in the development of computer-assisted instruction, and other administrative tasks. Salary and rank dependent upon qualifications. This is a nine-month contract beginning August 23, 1981. **Application deadline June 12, 1981.** Send application, resumes, transcripts, and three letters of recommendation to:

Dr. Dennis L. Smith
Associate Dean
Trumbull Campus KSU
4314 Mahoning Avenue NW
Warren, Ohio 44483

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PROGRAMMERS

MIS PROFESSIONALS

The National Corporation for Housing Partnerships, the largest private producer of low and moderate income housing in the nation, is seeking two MIS professionals:

PROGRAMMER ANALYST

...To be trained in the programming of GFS applications. GFS is a vendor-supplied general ledger, accounts payable/receivable program product.

...To assume COBOL applications development responsibilities for on-line and batch corporate information systems.

...QUALIFICATIONS: Three years or more of COBOL programming experience; degree or experience in accounting or finance; thorough knowledge of IBM OS JCL and utilities; desire and demonstrated ability to move into a project leader role.

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...Similar training and responsibilities as for the Programmer Analyst position but at a more junior level.

...QUALIFICATIONS: One year or more of COBOL programming experience; degree or experience in accounting or finance; experience with IBM OS JCL and utilities.

NCHP's computer center has a national terminal network with an IBM 4341 operating with VM, OS/MVT, HASP, CICS, CMS and Panvalet. Will be migrating to OS/VSI, CICS/VS and MVS.

NCHP offers a comprehensive company-paid employee benefit program and attractive salaries commensurate with qualifications.

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salary history to:
Personnel Administrator

NATIONAL CORPORATION
for HOUSING PARTNERSHIPS

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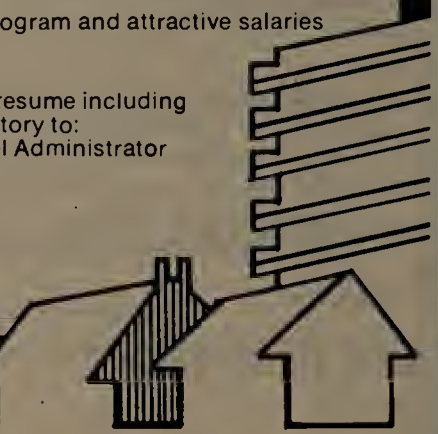

EDP PROFESSIONALS

Blue Cross of Western Pennsylvania

is seeking candidates for these present, or anticipated openings:

PROGRAMMER/ANALYST

Duties include programming and systems design/implementation activities in an IBM 370/158/168 MVS Cobol CICS IMS data base environment. Applicants should have 2-8 years experience in programming and systems design with a large scale IBM 370 configuration.

ARCHITECTURAL ANALYSTS DATA COMMUNICATIONS

Experience with evaluation specifications, design, development, and implementation of communication software; distributed processing network and security consideration in achieving efficient workable applications systems. Applicants should have 2 years experience in large computer systems, networking, or distributed processing; programming experience preferably in CICS or IMS/DC.

SR. SYSTEMS PROGRAMMER

Duties include software support and computer performance evaluation activities in an IBM 370/-158/168 MVS Cobol CICS IMS data base environment. Applicants should have 2-8 years systems programming experience with a large scale IBM 370 configuration.

BUSINESS SYSTEMS ANALYST

Duties include project management, reporting, and estimating; task identification; personnel assignments as well as effective systems design by incorporating current computer and data management technology. Applicants should have 2 years experience in application of EDP technologies to business systems; verbal and written communications; familiarity with either APL, BASIC, or COBOL. Position deals with large scale IBM 370 configuration.

SEND RESUME, DETAILING EMPLOYMENT HISTORY, EDUCATIONAL BACKGROUND, AND PRESENT SALARY:

Jackie Heidelberg
Personnel Specialist
Blue Cross
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DATA BASE ADMINISTRATOR

Manufacturer of oil well equipment has an immediate opening on our Information Systems staff.

Our computer system is an IBM 3032, running under OS/MVS with IMS and CICS.

The DBA will be responsible for definition and organization of the data base, security and integrity control, establishment of support tools, development of standards and procedures, integration of system through data base design, and performance monitoring.

This position reports to the director of Information Systems.

Send resume and salary history to:

GEARHART INDUSTRIES, INC.
ATTN: Director of Personnel
P.O. Box 1936
Fort Worth, TX 76101

Data Base Design

Large, non-profit, multi-state health care organization with assets in excess of $500 million dollars and corporate offices located in the Mid-west is seeking a qualified data processing professional with the ability to accept a leadership role in the development of a Corporate-wide Information Resource policy, standards and data definitions; to provide staff support to the Corporate IF Committee and task forces; and to assist our Divisions in developing and understanding consistent, workable Information Resource policies. This position will be accountable directly to the Corporate Director of Information Systems.

Position requirements are:

M.S. in Computer Science, Mathematics, or other technical discipline; or Bachelors degree with significant non-degree technical training. Also required seven years broadly based experience in Information Systems, a workable knowledge of state-of-the-art technology in Information Resource Management, and ability to maintain effective oral and written presentations. Two or more years experience in a health care environment and excellent communication skills are highly desirable. The position involves about 50% travel. Competitive salary is negotiable, depending upon education and experience. Liberal benefits are provided. To apply, send resume and salary history, in confidence, to:

C.W. Box 2574
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- Systems Analysts - Design and programming background in banking, life insurance, distribution, or manufacturing applications
- Software Designers - BSEE or BSCS with software design experience in flight, ground, or test systems software disciplines
- Systems Programmers - Opportunities for persons with two or more years experience in MVS, VM, or VSE
- Teleprocessing - CICS applications development, requires strong ALC skills, conceptual familiarity with internals

These positions include excellent compensation and full benefits programs, affording you a secure, challenging, and rewarding career.

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EOE M/F/V/H

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The successful candidate will be a person who relishes individual responsibility in a project team framework and takes pride in the accomplishment of planned goals within budget and on schedule. The position requires heavy travel or relocation as most work is performed on client premises. For a qualified individual who is able to relocated, total compensation will be in the $40,000 range. Good benefits package.

For immediate consideration, call collect or send written reply including resume and salary history in confidence to:

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Positions as SYSTEMS CONSULTANTS, SYSTEMS ANALYSTS and SR. PROGRAMMER ANALYSTS are now available to staff our new Dallas office, and in our other branches as well. For details about what CIBER can offer, please call us collect or forward your resume to our corporate office:

CIBER, Inc.
Attn: Rich Helppie, Director of Recruiting
Corporate Office
P.O. Box 577, Farmington, MI 48024
(313) 476-8500

CIBER, Inc., 2621 East Camelback Rd., Suite 197, Phoenix, AZ 85016, (602) 957-7090
CIBER, Inc., 23917 Cass, Farmington, MI 48024, (313) 476-8500
CIBER, Inc., 327 South East Dewey, Bartlesville, OK 74003, (918) 336-0855
CIBER, Inc., 7277 Regency Square, Suite 111, Houston, TX 77036, (713) 789-2522
CIBER, Inc., 3104 Northgate, Suite 1030, Irving, TX 75062, (214) 742-5290
CIBER, Inc., 4th National Bank Bldg., Suite 2500, Tulsa, OK 74119, (918) 583-7221
CIBER, Inc., 1700 Broadway, United Bank Ctr, Suite 2309, Denver, CO 80290, (303) 832-4564

CIBER

CONSULTANTS IN BUSINESS/ENGINEERING/RESEARCH

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PROGRAMMING SUPERVISOR

$2,171 to $3,222 per Mo.

The San Francisco Bay Area Rapid Transit District has an immediate opening for a fully experienced Programming Supervisor to direct the activities of the programming staff in the development, maintenance and enhancement of business data processing systems.

IBM 4341 equipment has been recently installed. Requires a BS in Business or Computer Science and five years in programming and systems experience in a business information processing environment; of which two years must have been in a supervisory capacity, technical competence utilizing IBM software in COBOL, virtual operating systems, DMBS time-sharing, communications and high-level report writing languages; knowledge of accounting principles, inventory control techniques, automated payroll processing and business management concepts are required. Candidates must have demonstrable managerial experience. Compensation package includes excellent fringe benefits. For more detailed information regarding job duties and additional employment requirements, a job posting is available for review at the BART Employment Office. The final filing date is May 22, before 2PM. Send resumes **(NO PHONE CALLS PLEASE) to: BART Employment Office, 800 Madison Street, Oakland, CA 94607.** BART is an equal opportunity/affirmative action employer. Women, Minorities and Handicapped are strongly encouraged to apply.

BART

COMPUTER PROGRAMMERS

CURRENT, INC., manufacturer of greeting cards and fine stationery items is expanding its Programming Department and is seeking Computer Programmers.

This position will be responsible for optimal transition of systems specifications into application code, design, coding and testing of compter programs for interactive and batch applications.

The ideal candidate should have a Bachelors Degree in Business, Accounting, Computer Science, Math or equivalent in experience and training or three years experience, two of which should have been in programming using COBOL.

We offer a competitive package that includes medical, dental, automobile/life insurance and full education reimbursement.

Send your resume and salary history to:

CURRENT, INC.
3525 N. Stone, Dept C11
Colorado Springs, CO 80907
ATTN: SAM SARGENT

Equal Opportunity Employer M/F

Job Opening With Cincinnati, Ohio Company:

Programmer Analyst using mathematical techniques in software creation for multi-employer pension fund administration, health and welfare plans and claims handling and health care statistics involving the application of applied statistics, actuarial science and business accounting methods and utilizing IBM System 34 computer and FORTRAN and RPG II software languages. Job responsibilities also include the management of operations of a software system and customer relations. Minimum educational requirements are a Master's Degree in Industrial Engineering or Business Administration or Computer Science with a major field of study in Statistics and Information Systems or Quantitative Analysis or Statistics and Accounting. Other special requirements are an ability to write computer programs in FORTRAN and RPG II; familiarity with applied statistics or actuarial science and as they relate to designing computer programs. Salary $20,000 per year. 40 hours per week basic with casual overtime. Send resume to Ohio Job Service, Reference 012, 1916 Central Parkway, Cincinnati, Ohio 45214.

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SOFTWARE DEVELOPMENT

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COMPILERS

Experience desired in compiler theory, technology, design and implementation with working knowledge of high level languages. Opportunities are available in CYBER 170, CYBER 200 and advanced product systems development.

NETWORKING

Design—Be part of the design group working on the evolving Control Data distributed communications network. A minimum of five years of experience in design and development of packet switching networks is required. Communications experience is desirable.

Maintenance—Strong communications software experience and knowledge of PASCAL will qualify you for a programming position within our network development area.

SYSTEMS EVALUATION

Design and implement tests to insure that standard network, data management and compiler software products meet design and usability requirements. The position requires software user knowledge and an interest in improving the quality of the products being evaluated.

Control Data offers competitive salaries, advancement potential and a wide range of benefits. For immediate and confidential consideration, send your salary requirements and resume to: K. McMahon, Control Data Corporation, 215 Moffett Park Drive, Sunnyvale, CA 94086

CONTROL DATA CORPORATION

Addressing society's major unmet needs

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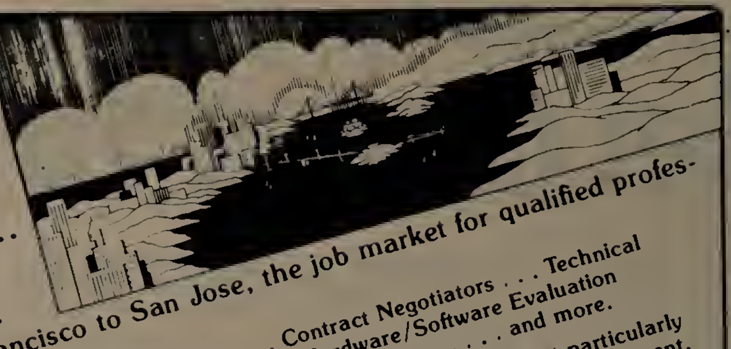
The San Francisco Bay Area



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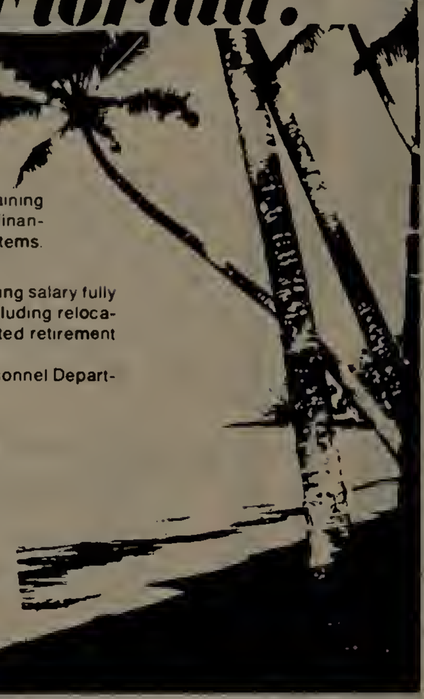

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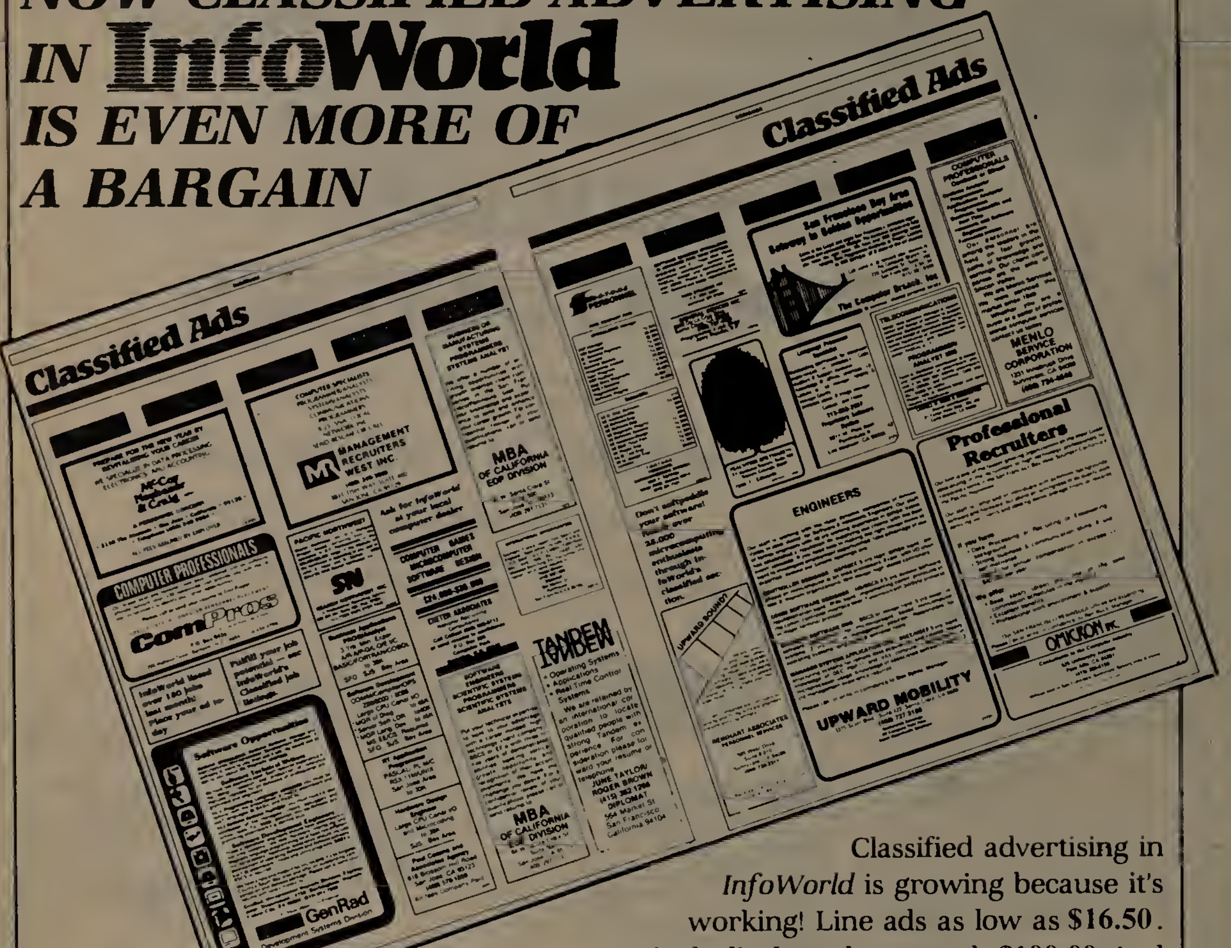

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Ad closing is every Friday, 6 working days prior to issue date.

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1 col x 4" — 338.80
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S/32
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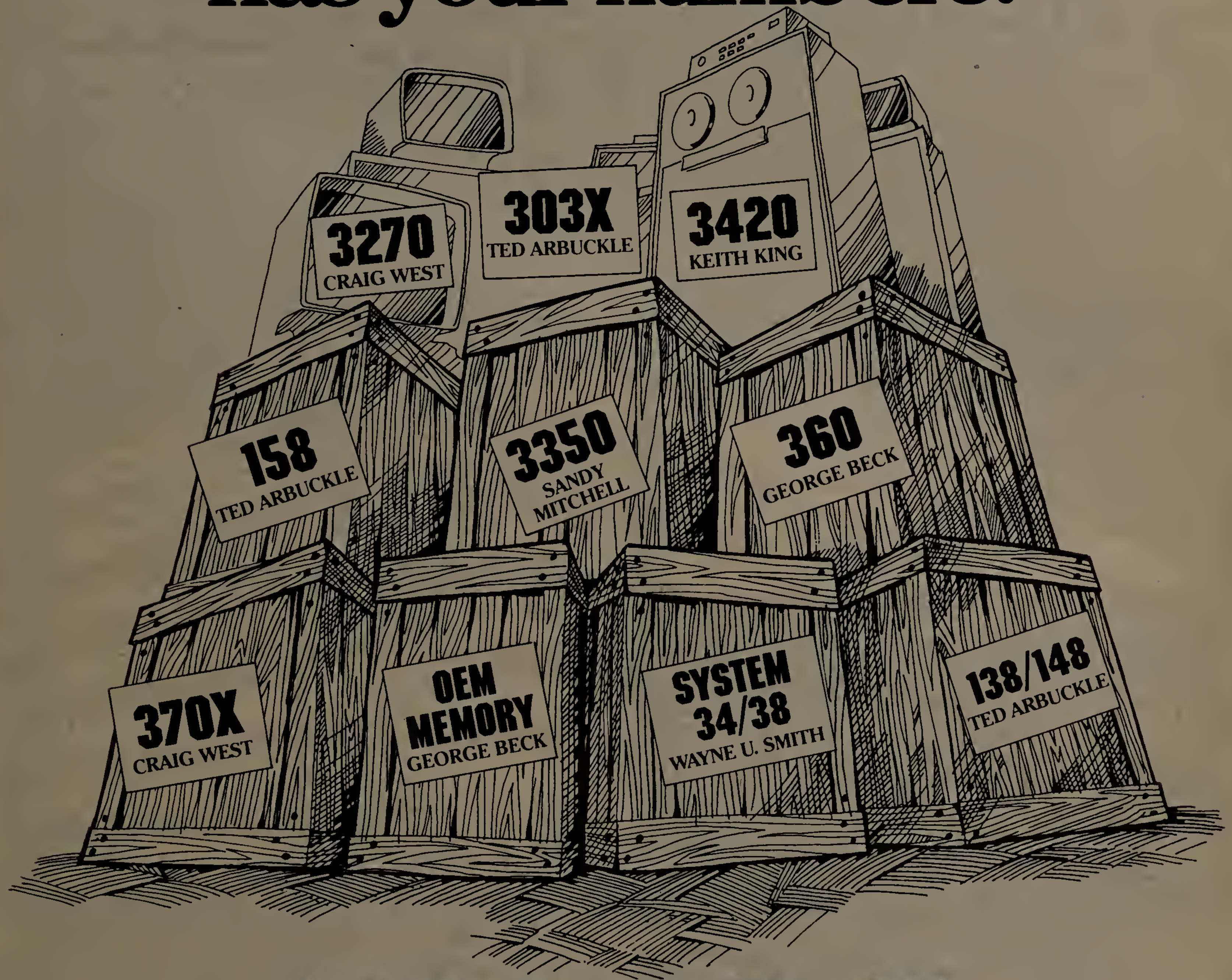

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SYSTEM

- 3
- 32
- 34
- 38

SERIES 1

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5251 3262 3344 3741
5256 3287 3411 3410
5211 3276 3340 029/129

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RL11AK	(*)	4900.00
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RL01AK	(*)	3295.00
RL02AK	(*)	5150.00
DH11AD	(*)	6750.00
DZ11A	(*)	2350.00
DZ11B	(*)	1825.00
DZ11E	(*)	3725.00
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DL11W	(*)	675.00
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DD11CK		405.00
DD11DK	(*)	860.00
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DR11C		450.00
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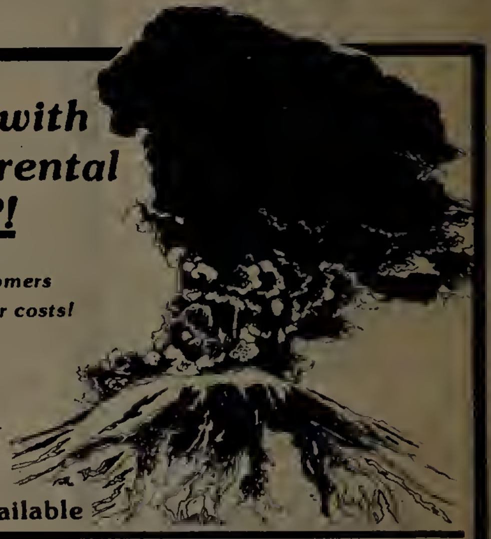

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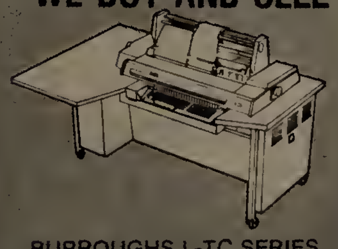

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PDP 11/15 8K	750.
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MB10 16K	750.
MD10 64K	5,000.
ME10 16K	1,000.
MF10 64K	9,500.
MG10 128K	30,000.
MH10 256K	60,000.
ME11-L 8K	100.
MF11-UP 16K	1,000.
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MM11F 4K	100.
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BM873-YA	100.
DA10	1,000.
DA11-A	100.
DA11-B	400.
DB11-A	800.
DB11-B	850.
DC11-A	25.
DD11-A	100.
DD11-B	250.
DD11-CK	400.
DL11-E	500.
DL11-W	690.
DM04	995.
DR11-A	75.
DR11-C	400.
DR15-C	950.
DT03-FM	3,500.
DT03-CC	3,500.
DT11-C	950.
DU11-DA	1,200.
DV08	995.
DW08-A	995.
FP11-B	5,000.
FP15	4,850.
KA11-YA	225.
KE11-A	50.
KE11-F	1,200.
KT11-D	1,000.
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M9301-YF	500.
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H728	100.
H739	100.
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H900	400.
H911	150.
H919	425.
844	200.
845	200.
778	100.
783	100.
RK06-SP	250.
M7850	100.

PDP-8

M8300	$ 459.
M8310	238.
M8311 YA	259.
M8315	480.
M8316	300.
M8317	300.
M8320	75.
M833	85.
M8330	250.
M8350	180.
M8360	250.
M837	180.
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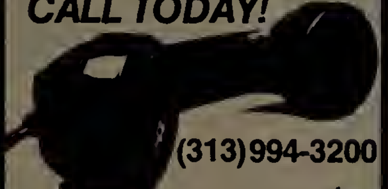

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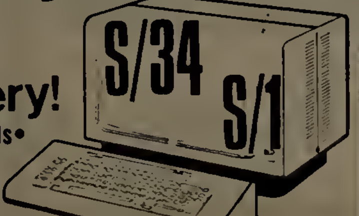

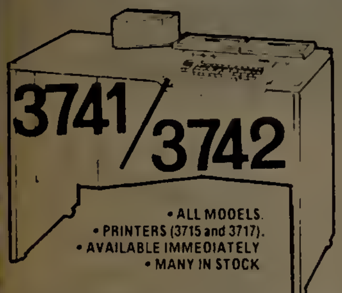

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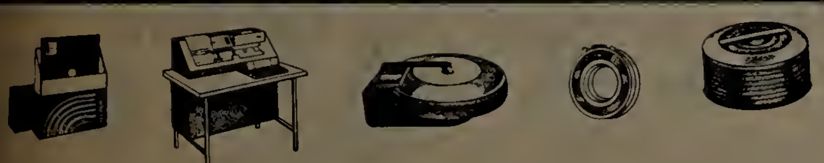

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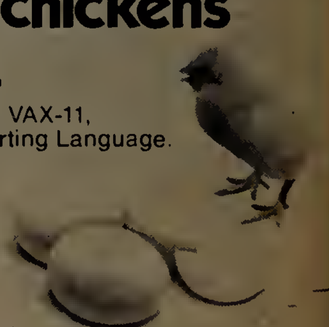

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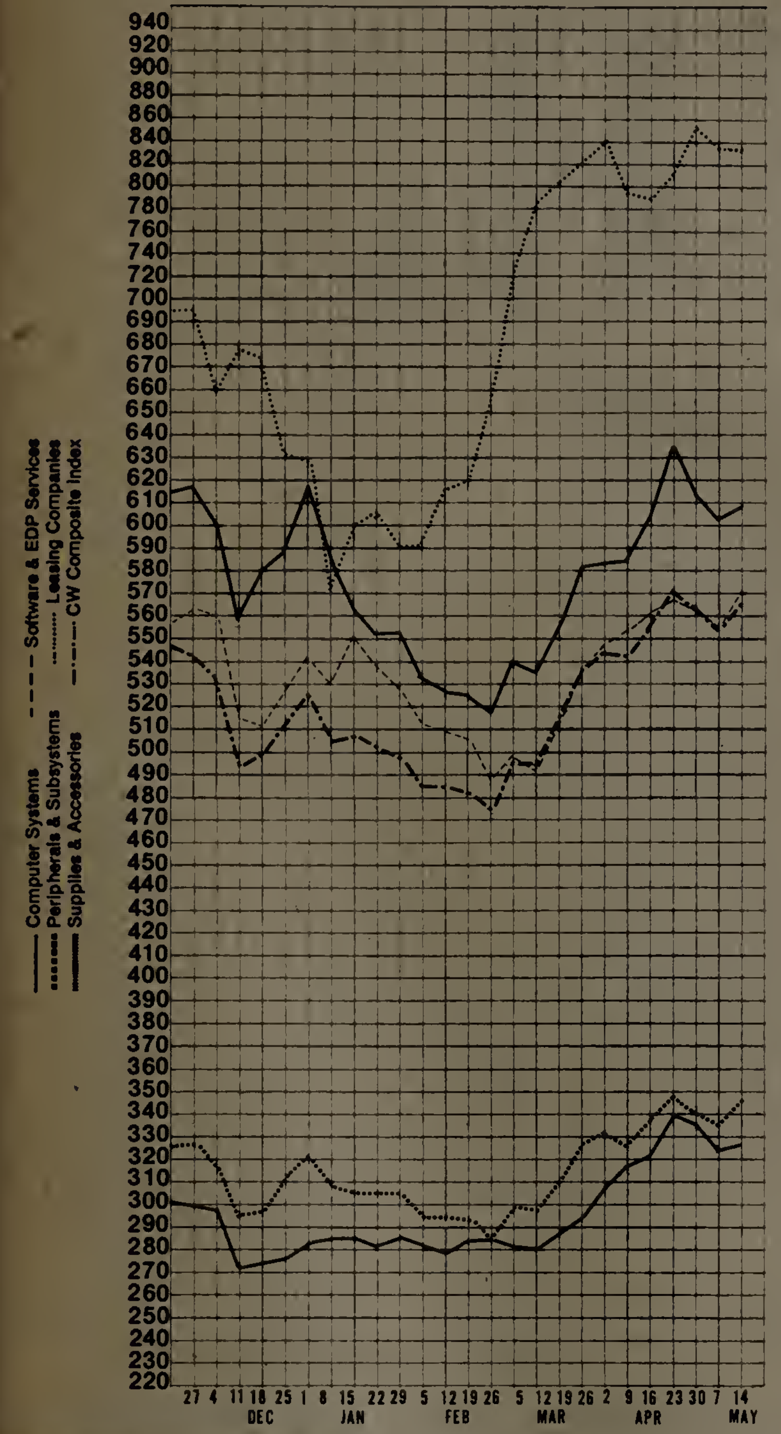

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 13, 1981

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	CLOSE MAY 13 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	39 3/8	+3 3/8	+9.3
N	BURROUGHS CORP	44- 88	43 1/2	-1 3/8	-3.0
O	COMPUTER AUTOMATION	9- 27	14 1/4	- 1/2	-3.3
N	CONTROL DATA CORP	35- 79	73	-2 1/4	-2.9
O	CRAY RESEARCH INC	10- 49	40 5/8	+4 1/2	+12.4
N	DATA GENERAL CORP	46- 87	63 1/2	+4 1/8	+6.9
N	DATAPOINT CORP	22- 65	57 1/2	-3 3/8	-5.5
N	DIGITAL EQUIPMENT	52-109	102 7/8	+3 3/8	+3.3
A	EECO INC	6- 19	16 7/8	+1	+6.2
N	ELECTRONIC ASSOC.	6- 12	7 1/4	- 1/2	-6.4
N	FOUR-PHASE SYSTEMS	19- 49	39 3/4	+6 3/4	+20.4
N	FOXBORO	31- 62	54	+ 1/2	+0.9
O	GENERAL AUTOMATION	7- 19	14 5/8	- 5/8	-4.0
O	GRI COMPUTER CORP	1- 3	1 1/2	0	0.0
N	HARRIS CORP	25- 60	52 3/8	-1 5/8	-3.0
N	HEWLETT-PACKARD CO	46-103	99 3/8	+2	+2.0
N	HONEYWELL INC	65-115	93 7/8	-1 1/8	-1.1
N	IBM	50- 79	56 3/4	-1	-1.7
O	MAGNUSON COMP SYSTS	20- 46	30	0	0.0
N	MANAGEMENT ASSIST	9- 25	14	- 5/8	-4.2
O	MINI-COMPUTER SYST	1- 6	2 3/8	0	0.0
N	MODULAR COMPUTER SYS	9- 31	12 7/8	-1 1/4	-8.8
N	MOHAWK DATA SCI	10- 31	23 7/8	+ 5/8	+2.6
N	NCR	52- 82	64	-3 1/2	-5.1
N	PRIME COMPUTER INC	10- 44	44 1/4	+3	+7.2
N	PERKIN-ELMER	13- 35	32 1/4	+2 5/8	+8.8
N	SPERRY CORP	42- 65	49 1/4	-2 1/2	-4.8
O	TANDEM COMPUTERS INC	13- 92	90	+ 3/4	+0.8
N	TEXAS INSTRUMENTS	79-150	109 1/2	-1	-0.9
A	WANG LABS.	17- 60	35 5/8	+1 1/2	+4.3

LEASING COMPANIES

EXCH		PRICE 1980-81 RANGE (1)	CLOSE MAY 13 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	25	+ 1/4	+1.0
N	COMDISCO INC	6- 24	21 1/4	+ 7/8	+4.2
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	7	+ 1/2	+7.6
M	DATRONIC RENTAL	3- 5	4 1/4	0	0.0
A	DCL INC	3- 6	3	0	0.0
N	DPF INC	5- 12	9 1/4	-1	-9.7
O	ITEL	1- 15	1	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 1/8	- 1/8	-3.8
N	RELIANCE GROUP INC	24- 84	78 3/4	+1 3/4	+2.2
N	U.S. LEASING	12- 30	24 1/4	- 1/2	-2.0

SOFTWARE & EDP SERVICES

EXCH		PRICE 1980-81 RANGE (1)	CLOSE MAY 13 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	5 3/4	0	0.0
O	ADVANCED SYSTEMS INC	12- 15	14 3/4	0	0.0
O	ANACOMP INC	7- 24	20 1/2	+1 3/8	+7.1
O	ANALYSTS INTL CORP	3- 14	8	+1	+14.2
A	APPLIED DATA RES.	6- 24	19 3/8	- 7/8	-4.3
N	AUTOMATIC DATA PROC	31- 63	58	-1 3/4	-2.9
O	CGA COMPUTER ASSOC	9- 17	10	-1	-9.0
O	COMPUTER HORIZONS	1- 5	2 1/4	+ 1/4	+12.5
O	COMPUTER NETWORK	4- 9	4 3/4	0	0.0
N	COMPUTER SCIENCES	11- 30	22 1/4	+1 5/8	+7.8
O	COMPUTER TASK GROUP	1- 23	17	-1 1/4	-6.8
O	COMPUTER USAGE	2- 10	4 1/4	0	0.0
O	COMSHARE	11- 21	14	-1 1/2	-9.6
O	CULLINANE DATABASE	18- 65	59	+4 1/4	+7.7
O	DATA DIMENSIONS INC	1- 6	1 5/8	0	0.0
O	DATATAB	1- 4	1 7/8	+ 1/2	+36.3
O	DSI CORP	4- 9	5 1/4	- 1/8	-2.3
O	DYATRON CORP	4- 11	8 3/4	0	0.0
N	ELECTRONIC DATA SYST	19- 51	49 1/2	+ 7/8	+1.7
O	INFORMATICS INC	9- 33	27 1/4	+ 1/2	+1.8
O	INSYTE CORP	1- 3	2 1/4	+ 1/8	+5.8
O	IPS COMPUTER MARKET.	1- 4	1 1/2	+ 1/4	+20.0
O	KEANE ASSOCIATES	3- 9	6	+ 1/2	+9.0
O	KEYDATA CORP	1- 5	3/4	0	0.0
A	LOGICON	12- 34	31 7/8	+2 7/8	+9.9
O	MATHEMATICA INC	5- 18	13 1/2	- 3/4	-5.2
O	MATHEMATICAL APP GRP	7- 33	23 1/2	+1	+4.4
O	NATIONAL DATA CORP	5- 25	23 1/8	+ 3/4	+3.3
N	PLANNING RESEARCH	5- 13	7 1/8	- 1/8	-1.7
O	PROGRAMMING & SYS	1- 1	1	+ 1/8	+14.2
O	RAPIDATA INC	4- 11	7 7/8	- 1/2	-5.9
O	REYNOLDS & REYNOLD	19- 34	20 3/4	+ 1/4	+1.2
O	STSC INC	6- 28	20 1/4	+ 3/4	+3.8
O	SCIENTIFIC COMPUTERS	3- 17	10 1/2	- 1/4	-2.3
N	TYMSHARE INC	17- 56	48 5/8	+ 7/8	+1.8
A	URS CORP	5- 17	15	- 5/8	-4.0
N	WYLY CORP	4- 20	12 1/8	- 3/8	-3.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	CLOSE MAY 13 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	11- 24	13 1/2	- 1/4	-1.8
A	ANDERSON JACOBSON	9- 25	17	+ 1/8	+0.7
O	AUTO-TROL TECHNOLOGY	18- 62	25	+1 1/4	+5.2
O	BEEHIVE INT'L	2- 18	15 1/2	+ 1/2	+3.3
A	BOLT,BERANEK & NEW	8- 25	21 1/4	- 1/4	-1.1
N	BUNKER RAMO	17- 54	52	+3 3/8	+6.9
O	CAMBRIDGE MEMORIES	1- 9	7 1/8	- 3/8	-5.0
N	CENTRONICS DATA COMP	11- 55	12	- 3/4	-5.8
A	CETEC CORP	3- 8	7	- 1/8	-1.7
O	COMPUTER DEVICES INC	5- 10	8 1/4	0	0.0
O	COGNITRONICS	1- 11	10 5/8	+1 1/2	+16.4
O	COMPUTER COMMUN.	2- 10	2	0	0.0
O	COMPUTER CONSOLES	4- 31	30 1/2	+6	+24.4
O	COMPUTER TRANSCEIVER	1- 7	7	+1 1/8	+19.1
N	COMPUTERVISION CORP	24- 95	86 1/2	+5 3/8	+6.6
N	CONRAC CORP	13- 25	21 1/4	- 1/8	-0.5
A	DATA ACCESS SYSTEMS	6- 23	12 1/2	- 5/8	-4.7
A	DATAPRODUCTS CORP	11- 44	33 3/4	-2 1/2	-6.8
O	DATUM INC	2- 5	3 1/8	+ 1/8	+4.1
O	DECISION DATA COMPUT	2- 6	4 3/8	- 3/8	-7.8
O	DELTA DATA SYSTEMS	1- 3	3 1/4	+ 5/8	+23.8
O	DATARAM CORP	6- 37	9 1/4	- 5/8	-6.3
N	ELECTRONIC M & M	3- 9	5 1/8	- 1/8	-2.3
O	EVANS & SUTHERLAND	21-107	105	+12	+12.9
O	FABRI-TEK	1- 4	3 7/8	+ 7/8	+29.1
O	GENERAL COMPUTER SYS	1- 12	8 3/4	0	0.0
O	GEN'L DATA COMM IND	8- 22	14 1/4	- 1/2	-3.3
O	GENERAL TERMINAL CP	1- 4	1 1/4	+	+5.0
N	HAZELTINE CORP	12- 33	22	- 3/4	-3.2
O	INFORMATION INTL INC	8- 15	11	0	0.0
O	INTEL CORP	23- 50	35 1/4	-1 1/4	-3.4
A	LUNDY ELECTRONICS	4- 17	10	0	0.0
O	MSI DATA CORP	5- 21	19	+ 3/8	+2.0
N	MEMOREX	10- 34	12 5/8	+ 3/8	+3.0
O	NETWORK SYSTEMS CORP	14- 25	23 3/4	+3 1/4	+15.8
O	OMEX	2- 12	12	+3	+33.3
A	PARADYNE CORP	9- 48	47 1/4	+5 1/2	+13.1
A	PENRIL CORP	9- 17	13 3/4	- 3/4	-5.1
O	RAMTEK CORP	10- 23	15	-5 1/2	-26.8
O	RECOGNITION EQUIP	5- 21	14 7/8	0	0.0
O	SCAN DATA	1- 5	2 1/8	- 1/8	-5.4
N	STORAGE TECHNOLOGY	12- 32	31 1/8	+3 1/8	+11.1
O	SYKES DATATRONICS	14- 57	53 1/2	+3 1/2	+7.0
O	T BAR INC	14- 24	17 3/4	-1 1/8	-5.9
A	TEC INC	3- 9	4 3/4	- 1/8	-2.5
N	TEKTRONIX INC	42- 70	57 7/8	- 1/2	-0.8
N	TELEX	3- 9	8	+1	+14.2
O	TESDATA SYSTEMS CP	8- 26	9 1/4	- 1/4	-2.6
A	TIMEPLEX INC	5- 22	13 5/8	+1 1/8	+8.0
O	WILTEK INC	1- 3	2 7/8	- 1/8	-4.1

SUPPLIES & ACCESSORIES

EXCH		PRICE 1980-81 RANGE (1)	CLOSE MAY 13 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 18	16	+ 3/8	+2.3
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	8- 22	18 1/8	+1 1/8	+6.2
O	CYBERMATICS INC	1- 2	1 1/4	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	14 1/4	0	0.0
N	ENNIS BUS. FORMS	13- 21	18 1/2	+ 7/8	+4.8
N	3M COMPANY	48- 65	58 1/4	-1 1/2	-2.5
O	MOORE CORP LTD	27- 38	35 5/8	0	0.0
N	NASHUA CORP	20- 35	22 3/8	- 3/8	-1.6
O	STANDARD REGISTER	22- 35	33 1/4	0	0.0
A	TAB PRODUCTS CO	8- 30	20 3/4	+ 1/2	+2.4
N	WALLACE BUS FORMS	12- 26	25 1/8	+ 1/4	+1.0

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